University of Alberta

An Exploratory Study in the Use of the Internet for Health Promotion: The Development of a Web Site to Present a Meditation Lesson for Stress Reduction

By

James Douglas Vincent

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A thesis submitted to the Faculty of Graduate Studies and Research in partial fulfillment of the requirements for the degree of Master of Science

Centre for Health Promotion Studies

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The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research for acceptance, a thesis entitled *An Exploratory Study in the Use of the Internet for Health Promotion: The Development of a Web Site to Present a Meditation Lesson for Stress Reduction* submitted by *James Douglas Vincent* in partial fulfillment of the requirements for the degree of *Master of Science.*

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April 4, 2001

Abstract

The purpose of this study was to develop a web site and to test a brief Internet based lesson in the use of meditation as a method for stress reduction. Subjects were self-selected through the utilization of Internet Search portals. The greater percentage of respondents reported they experienced a high level of satisfaction with the lesson. All of those who did not consent to be subjects took the lesson, indicating an interest in the subject and perhaps it's presentation format. It appears that this simple form of web based instruction could be a useful tool for building Internet based health education and health promotion and as such requires further study. The lesson was successful in helping most of the subjects reduce their stress, as reported by a high percentage of survey respondents, and so forms a template for further investigation.

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Chapter One

Introduction and Research Purpose

Dr. Hans Selye, considered the father of modern stress research defined what we today consider to be stress, and also what we consider to be the basis for stress treatment. He gave meaning to words such as "eustress" and "distress". He defined the body's normal autonomic responses as daily stress responses and linked each physical reaction to a research methodology that has been expanded upon over time. He is quoted as having said, "Complete freedom from stress is death (Selye, 1974, p32)".

It is interesting that the learning Selye represented has been reflected in society in a less academic way than he perhaps intended. For instance, although his purpose was not to use meditation for stress management, the Maharishi Mahesh Yogi introduced Transcendental Meditation to the United States in 1959 and in retrospect, it seems inevitable now, that it has been used for this purpose. Meanwhile, the history of stress management in the realm of medical treatment has traditionally followed the use of prescribed medication to treat the various symptoms that occur as a result of too much stress. For example, in 1963 Valium was introduced to the North American market as a minor tranquilizer used to treat non-psychotic anxiety states. In 1973 Xanax, another anti-anxiety drug began to be prescribed for the same disorders. Then prozac, an antidepressant medication was introduced in 1978. In 1983 stress as a health problem gained increased public recognition with its own cover in Time magazine. In 1986 Zoloft, a drug that belongs to the same class of antidepressants as Prozac was first prescribed to treat stress related depression. In 1996 stress management was a 9.4 billion dollar

industry in the USA alone. As such, a less traditional treatment pattern began to emerge. For example, St. John's Wort, an herbal remedy for depression, received consumer attention as a Prozac alternative in 1997. Stress, as a perceived health problem, has throughout the past forty years, become ingrained throughout western culture. (Columbia School of Graduate Journalism, 1998)

Stress appears to be a normal and necessary part of life. But when stress levels grow beyond a level that a person can manage, it becomes a problem that can affect both their mental and physical health. In time, this effect can be harmful. As indicated by the above discussion, it appears people want to learn how to understand stress and its effects as well as how to reduce stress. Stress reduction is a learned process that can reverse the harmful effects of stress and enhance an individual's health. This study explores the possibility that a method for stress reduction can be effectively presented in a formal manner, to a large population using a recent invention – the Internet.

Computer Based Instruction (CBI)

CBI employs computer technology to assist an instructor with teaching or guiding the learning program of individual students. Its main components consist of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI) and Computer Mediated Communication (CMC), each of which may employ a variety of computer based media. CAI employs the instruction modes of tutorial, review and practice, and simulation. CMI includes diagnostic assessment and prescriptive study assignments. CMC uses a computer to communicate information, both synchronously and asynchronously (Szabo, 2000). CMC has, as one of its components, Web Based Instruction (WBI), a form of

CMC that uses an Internet browser. The intervention for this thesis study, defined as a component of WBI, is a Web Based Information System (WBIS). It lacks the interactive component of WBI. It presents a lesson in meditation, but does not ask the lesson user to provide feedback as part of the lesson.

Meditation

Kabat-Zinn (1991) discusses meditation by first defining the concept of wholeness. The very word health means whole. Whole implies integration, an interconnectedness of all parts of a system, a completeness. The nature of wholeness is that it is always present. While every organism is whole in itself, it is also embedded in a larger wholeness. Looked at in this way, health is a dynamic process, not a fixed state that you can hold onto. This notion of wholeness is found not only in the meaning of the words health and healing, but is embedded in the deep meaning of the words meditation and medicine, words that are obviously related to each other in some way. The words meditation and medicine both come from the Latin mederi which means "to cure". Mederi itself derives from an earlier Indo-European root meaning "to measure" (Kabat-Zinn, (1991).

Kabat Zinn (1991) then states:

" Now what might the concept of measure have to do with either meditation or medicine? Nothing, if we are thinking of measure in the usual way, as the process of comparing the dimensions of an object to an external standard. But the concept of "measure" has another, more Platonic meaning. This is the notion that all things have their

own "right inward measure" that makes them what they are, that gives them their properties." (p. 163)

He goes on to define medicine in this light, as being basically the means by which right inward measure is restored when it is disturbed by disease or illness or injury. Meditation, by the same token, is the process of perceiving directly the right inward measure of one's own being through careful, non-judgmental self observation. Right inward measure, says Kabat-Zinn (1991), in this context, is another way of saying wholeness. The choice of meditation training as the central and unifying practice in his Stress Reduction Clinic at the University of Massachusetts Medical Centre was not an arbitrary decision (Kabat-Zinn, 1991).

The definition for meditation, as stated above, which is the definition for this project is: "...the process of perceiving directly the right inward measure of one's own being through careful, non-judgmental self observation" (Kabat-Zinn, 1991, p. 163). The connection between meditation and medicine is a matter of maintaining the "wholeness" or health of an organism. Stress is something that can disrupt the health of a person, and if meditation can help to control the effects of stress, then how to meditate is a valuable process one can learn and a possible aid to preventing a number of medical conditions.

Research Purpose

Because it is possible that a person may have a self-perceived need to reduce stress, this study was designed to introduce meditation as a potential method to meet that need. The Internet, being constructed of wires that connect millions of computers, was seen as a good way to present a lesson in meditation as a Web Based Information System

(WBIS) by using those computers as a generalized interface for the lesson. The overall purpose of this study was therefore to develop and test a simple and brief Internet based lesson in the use of meditation as a method for stress reduction.

Chapter Two

Literature Review

Introduction

The following literature review is divided into 5 sections. The first will discuss the history of the Internet. A discussion of Computer Mediated Communication (CMC) and Web Based Instruction (WBI) follows. (It is important to note that this project is defined as a Web Based Information System (WBIS) and as a component of WBI). The third section discusses Internet based health education, its history and availability as well as its future importance as part of health promotion. Computer Assisted Instruction (CAI) for health education is next discussed. While much of the health education focus in CAI has been in the area of nutrition, it has also been widely used as a method for teaching health risk and educating nursing students. In the literature, it appears CAI is the most common way of presenting material in a health education format using computers. The final section will discuss meditation and health outcomes. Publications in this area have focused on the use of meditation as a means of improving physical and mental health. Then the literature review will conclude with a discussion of the rationale for this study.

History of the Internet

To provide some insight into why this study was considered, a discussion of the history of the Internet as a form of computer-mediated communication is useful. As discussed by Jones (1998) the connections in place for the Internet, were formed in the 1960s and early 1970s when the U.S. Department of Defense and several research

universities, via DARPA (Defense Advanced Research Program Agency) linked computers. The resulting network, Arpanet, allowed for access to each site's computers not only for communication but also for research.

The Internet essentially serves as the main connecting point for many other networks. It has, in a sense, come to be a "backbone" by which networks link up with each other. In 1998, Jones (1998), estimated that there were over 30,000 computer networks with over 1.5 million computers connected through the Internet, and the Internet's number of users was growing by 10 percent monthly. The number of Internet users around the world is constantly growing. It is estimated that by the year 2002, 490 million people around the world will have Internet access, that is 79.4 per 1,000 people worldwide, and 118 people per 1,000 by year-end 2005. The top 15 countries will account for nearly 82 percent of the these worldwide Internet users (including business, educational, and home Internet users). The estimated world-wide total Internet users at the end of the year 2000 was 374.9 million. (Cyberatlas, 2000).

There are several purposes the Internet can serve, but the two its users most frequently engage with are electronic mail and newsgroups. Not coincidentally, these two purposes form the basis for CMC and are the ones most discussed in CyberSociety, (Jones, 1998). It is a small leap from listservs and newsgroups to hypertext linked web pages and then to using the Internet as a medium for WBI and a WBIS.

Computer Mediated Communication and Web Based Instruction

CMC has been described as any communication pattern mediated through the computer (Metz, 1992). Walther and Burgoon (1992) argue that for many computer

users, CMC is no longer a novelty but a communication channel through which much business and social interaction takes place. They note that CMC produces much different affective and relational patterns than do other types of communication, due to the reduction and types of cues available to participants. A component of CMC is WBI.

The ubiquitous nature of electronic communication has firmly manifested itself in computer-mediated communication (CMC). Through communication services like America Online, MCIMail, the Internet, Usenet and numerous other mail, messaging and bulletin-board services (BBSes) electronically-distributed, almost instantaneous, written communication has for many people supplanted the postal service, telephone, even the fax machine. Other computer-communication networks spring to life seemingly every week, and even cable companies have ventured into the networks to provide cable subscribers CMC connections. (Jones 1998)

Khan (1997) defines Web -Based Instruction (WBI) as being any hypermedia-based instructional program which utilizes the attributes and resources of the World Wide Web to create a meaningful learning environment where learning is fostered and supported. Relan and Gillami (1997) define WBI as being the application of a repertoire of cognitively oriented instructional strategies within a constructivist and collaborative learning environment, utilizing the attributes and resources of the World Wide Web . Some of the current thought in this area stresses WBI as an instructional learning system as well.

Web -Based Instruction, also called Web -Based Training (WBT), is defined by Clark (1996) as any individualized instruction delivered over public or private computer

networks and displayed by a Web browser. WBT is not downloaded and saved CBT (Computer Based Training), but rather on-demand training stored on a server and accessed across a network. Web -based training can be updated very rapidly, and access to training controlled by the training provider. Though the above definitions are not identical, there is a common theme, which is that WBI takes advantage of the Internet and World Wide Web to deliver information in tandem with interaction.

There is increasing interest in the use of the World Wide Web for teaching purposes. Interest is increasing because, as Burgstahler (1997) has noted, the web provides new ways to teach and learn. It allows new things to be done, as well as doing traditional things in new ways. WBI, which is an emerging field in education, is nevertheless, a part of the rapid growth that is the Internet. Reasons for the growth of WBI include: 1) It promotes growth of distance education economically (as a reliable and inexpensive source) as compared to computer based training, live broadcasts, video tapes, and so on, (Relan & Gillani, 1997 and Santi, 1997), 2) It enables learners who prefer or are required to learn outside traditional classrooms to attend classes at their homes or offices, (Bannan & Milheim, 1997), and 3) It provides a delivery medium, content provider, and subject matter in one package, unlike other mediums, such as computer based training, that require a separate delivery mechanism (McMa[illegible], 1996).

Nichols (1995) predicted that the potential benefit from formulating evaluation methodologies for the Web [for instructional materials] depends on whether or not the Web will become a permanent medium or a passing fad. In fact, the Web will likely soon become the most popular medium for the delivery of distance education type materials. Its safe to say that in the year 2001, the Internet is not a fad, but is established as an

inherent communications system within North American society as a vehicle for communication and entertainment.

Health Education and the Internet

It is well known that health promotion has its history deeply rooted in health education. As stated in the 1986 Ottawa Charter for Health Promotion:

> Health promotion is the process of enabling people to increase control over, and to improve, their health. To reach a state of complete physical, mental and social wellbeing, an individual or group must be able to identify and to realize aspirations, to satisfy needs, and to change or cope with the environment. Health is, therefore, seen as a resource for everyday life, and not the objective of living. Health is a positive concept emphasizing social and personal resources, as well as physical capacities. Therefore, health promotion is not just the responsibility of the health sector, but goes beyond healthy lifestyles to wellbeing (WHO, 1986). Health promotion supports personal and social development through providing information, education for health and enhancing life skills. By so doing, it increases the options available to people to exercise more control over their own health and over their environments, and to make choices conducive to health (WHO, 1986). Enabling people to learn throughout life, to prepare themselves for all of its stages and to cope with chronic illness and injuries is essential. This has to be facilitated in school, home, work and community settings. Action is required through

> educational, professional, commercial and voluntary bodies, and within the institutions themselves (WHO, 1986) (p. 1)

From an educational viewpoint, the Internet may well be a central influential factor in building the future of health education and health promotion. For instance, Cassell and Jackson (2000) present a theoretical rationale for using the Internet to conduct persuasive public health interventions. Through an examination of the conceptual bases of persuasion, they posited that the World Wide Web and other Internet-based resources have many of the characteristics necessary for effective communication and may, in fact, constitute a hybrid channel that combines the positive attributes of interpersonal and mass communication. They felt that the notion that the Internet features many of the persuasive qualities of interpersonal communication makes it a prime candidate for the application of key behavioral science theories and principles to promote healthier behaviors. The broad reach that the Internet shares with many mass communication channels indicates an economy to Internet-based efforts to communicate with large audiences. They believe that if the Internet can be used for persuasive health communication and its reach continues to expand, it is time for public health professionals to explore the design and evaluation of Internet-based interventions directed at health behavior change.

Helwig, Lovelle, Guse, and Gottlieb (1999), performed a pilot study of an Internet patient education system to obtain information on the usefulness of, feasibility of, and patient satisfaction with this type of information. Fifty patients participated in the study. Forty-seven patients (94%) found the Internet information helpful. Most patients spent their time on-line intensely reading, and men spent significantly more time on-line ($P = .007$). Thirty-seven patients (77%) stated they would change a health behavior because of

information they had read on the Internet; 45 (90%) were more satisfied with their visit than usual, and 46 (92%) would use the Internet center at the clinic again. They concluded that patients can obtain useful information from moderated Internet patient education systems and may plan to change health behaviors on the basis of that information. Internet patient information in the physician's office can improve patient satisfaction with clinic visits.

Horton, Garland, and Fishman (2000) conducted a study to determine what percentage of patients in a typical radiology outpatient setting own or have access to a computer with Internet capabilities and how many of these patients would find an educational radiology web site useful. This study showed that 61.5% of patients had access to the Internet, and 83.3% of these would use such a site. It is likely that these numbers will increase with the rapid growth of the Internet and the steadily increasing number of homes with computers.

It is studies like these that evoke a high interest in the widely available access to health education that the Internet provides. It is this access that could form the basis for an entire section of health promotion that deals with the application of health education in the form of interactive lessons that are consumer centric. This requires more investigation, and it is hoped that the study that has resulted in this paper can help to form a basis for further research in this area.

CAI for Health Education

An extensive search of the pertinent journal based literature indicates there has been significant research done in the area of CAI as a method of teaching health

promotion, particularly related to individual health behaviours. In general, across content, CAI compares favorably with conventional instruction. In a comprehensive review, Szabo (1998) concluded that learning and attitude, under CAI is as good as or better than conventional instruction, learning time is significantly less, and access to instruction is significantly increased. Burnett (1989) used computers to teach a group of high school students better dietary habits and conventional methods for 2 other high school groups. Data collected indicated that dietary habits improved in the CAI group more than the 2 others. Raines & Ellis (1982) developed a conversational microcomputer-based health risk appraisal program and tested on over 200 users at 3 locations in urban and suburban Minneapolis. This appraisal was well accepted and it was found that 92% of the study subjects stated they would change a behavior based on their use of the software. Turner, Singleton & Easterbrook (1997) studied an interactive prototyping model for development of four computer software modules on sexual issues for British youth. Feedback from youth and adults attests to the feasibility of development, implementation, and instructional usefulness. Rhodes, Fishbein & Reis (1997) explored how behavioral theory can facilitate the development, implementation, and evaluation of health promotion software packages intended to influence personal health practices and/or assess health risks. A series of six steps were suggested to help to facilitate direct application of the theory-based process to health promotion software development. Brug, Johannes, Campbell, Marci, van Assema & Patricia (1999) provided people with computer-tailored nutrition education and reviewed the studies on the impact of computer-tailored nutrition education. The results pointed to the conclusion, that computer-tailored nutrition

education is more likely to be read, remembered, and experienced as considered personally relevant compared to standard materials.

Computer-tailored nutrition education also appears to have a greater impact in motivating people to change their diet, (their fat intake in particular), although no definite conclusions in this area could be drawn. Bosworth, Kris, Gustafson, David, Hawkins & Robert (1994) studied the use of their Body Awareness Resource Network (BARN), a computer-based health-promotion and behavior-change system for use with adolescents that provided computer based information and decision support on 6 topics: AIDS, alcohol and other drugs, body management, human sexuality, smoking, and stress management. Overall, users of BARN were more likely to remain free of risk-taking behaviors than nonusers. BARN use was associated with improvements in risk-relevant behaviors. The results suggest that a computer-based system may be a powerful tool for the reduction of risk-taking behavior in adolescents.

Computer-assisted instruction (CAI) use has increased for nursing education during the past few years, causing nurse educators to express concern regarding its effectiveness. A study conducted by Madorin and Iwasiw (1999) found that higher preclinical self-efficacy scores for their experimental group support the use of CAI as an important aspect of professional clinical education. Cutbacks to educational funding, along with the rising costs of clinical teaching, have motivated studies of this method for nursing education, as well an increase in the use of CAI as a teaching method. Another study by Ryan, Carlton & Ali (1999) used a one-group, posttest design to measure the effectiveness of an international exchange via the Internet, designed to enhance global awareness and computer use of 25 nursing students enrolled in a rural university in the southeastern

United States. International exchange via the Internet was determined to be an effective strategy for heightening international awareness and increasing Internet use.

Murphy-Ende (1996) examined self-directed learning, self-efficacy and health value in public health education, before and after the use of a breast cancer computer assisted instruction program, and tried to clarify the reciprocal effects between CAI and these attributes. The results of this study suggested that there is a relationship between self-directed learning and self-efficacy. Some self-directed learners tended to use the computer method of asking questions rather than participating in support group discussion. However, those with a high school education or less, or those with lower income, did demonstrate an increase in self-directed learning toward their health.

Meditation and Health Outcomes

The goal of meditation, says Kabat-Zinn (1986), is for the student to become more aware, more in touch with life, and with whatever is happening in their own body and mind at the time it is happening — or in the present moment.

Until recently, the primary purpose of meditation has been religious, although its health benefits have long been recognized. During the past 15 years, it has been explored as a way of reducing stress on both mind and body. Cardiologists, in particular, often recommend it as a way of reducing high blood pressure (Kabat-Zinn, 1986).

There are many forms of meditation -- with many different names -- ranging in complexity from strict, regulated practices to general recommendations, but all appear to produce similar physical and psychological changes. If practiced regularly, meditation

develops habitual, unconscious microbehaviors that produce widespread positive effects on physical and psychological functioning. Meditating even for 15 minutes twice a day seems to bring beneficial results (Benson, 1975; Chopra, 1991; Goleman, 1977; Mahesh Yogi, 1963).

While many individuals and groups have examined the effects of meditation, two major meditation programs have extensive bodies of research: transcendental meditation and the relaxation response. In 1968, Harvard cardiologist Herbert Benson was asked by TM practitioners to test them on their ability to lower their own blood pressures. At first, Benson refused this suggestion as "too far out" but later was persuaded to do so. Benson's studies and an independent investigation at the University of California at Los Angeles were followed by much additional research on TM at Maharishi International University in Fairfield, IA, and at other research centers. Published results from these studies report that the use of TM is directly associated with:

a) reduction of chronic pain (Kabat-Zinn et al., 1986);

b) reduced anxiety Kabat-Zinn et al., 1986);

c) reduction of high blood pressure (Cooper and Aygen, 1978);

d) reduction of serum cholesterol level (Cooper and Aygen, 1978);

e) reduction of substance abuse (Sharma et al., 1991);

f) longitudinal increase in intelligence-related measures (Cranson et al., 1991);

g) treatment of posttraumatic stress syndrome in Vietnam veterans (Brooks and Scarano, 1985);

h) blood pressure reduction in African-American persons (Schneider et al., 1992); and

i) lowered blood cortisol levels initially brought on by stress (MacLean et al., 1992).

Convinced that meditation was a possible treatment for high blood pressure, Benson later pursued his investigation at the Mind-Body Medical Institute at Harvard Medical School. He identified what he calls "the relaxation response," a constellation of psychological and physiological effects that appear common to many practices: meditation, prayer, progressive relaxation, autogenic training, and the presuggestion phase of hypnosis and yoga (Benson, 1975).

In a randomized controlled clinical trial, Castillo-Richmond, Schneider, Alexander, Cook, Myers, Nidich, Haney, Rainforth & Salerno (2000), evaluated the effects of the TM program on carotid intima-media thickness (IMT) in hypertensive African American men and women, aged >20 years, over a 6- to 9-month period. From the initially enrolled 138 volunteers, 60 subjects completed pretest and posttest carotid IMT data. The assigned interventions were either the TM program or a health education group. By use of B-mode ultrasound, mean maximum IMT from 6 carotid segments was used to determine pretest and posttest IMT values. Regression analysis and ANCOVA were performed. Age and pretest IMT were found to be predictors of posttest IMT values and were used as covariates. The TM group showed a significant decrease of -0.098 mm (95% CI -0. 198 to 0.003 mm) compared with an increase of 0.054 mm (95% CI -0.05 to 0.158 mm) in the

control group (P=0.038, 2-tailed). Stress reduction with the TM program appeared to be associated with reduced carotid atherosclerosis compared with health education in hypertensive African Americans.

In another study, investigators looked at the acute effects of Transcendental Meditation (TM) on increased peripheral vasoconstriction (ie, total peripheral resistance, or TPR). (Barnes, Treiber, Turner, Davis & Strong, 1999). They found that TPR, which is major determinant of blood pressure, decreased significantly during TM. Decreases in vasoconstrictive tone during TM may be the hemodynamic mechanism responsible for reduction of high blood pressure over time.

Kabat-Zinn, Wheeler, Light, Skillings, Scharf, Cropley, Hosmer & Bernhard (1998), studied whether or not mindfulness meditation-based stress reduction intervention delivered by audiotape during ultraviolet light therapy can increase the rate of resolution of psoriatic lesions in patients with psoriasis. Thirty-seven patients with psoriasis about to undergo ultraviolet phototherapy (UVB) or photochemotherapy (PUVA) were randomly assigned to one of two conditions: a mindfulness meditation-based stress reduction intervention guided by audiotaped instructions during light treatments, or a control condition consisting of the light treatments alone with no taped instructions. Cox-proportional hazards regression analysis showed that subjects in the tape groups reached the Halfway Point ($p = .013$) and the Clearing Point ($p = .033$) significantly more rapidly than those in the no-tape condition, for both UVB and PUVA treatments.

Tooley, Armstrong, Norman & Sali (2000), conducted a study to see whether a period of meditation could influence melatonin levels. Increased melatonin levels have been associated with positive outcomes for both breast and prostate cancer patients. Two

groups of meditators were tested in a repeated measures design for changes in plasma melatonin levels at midnight. Meditators showed significantly higher plasma melatonin levels in the period immediately following meditation compared with the same period at the same time on a control night. It was concluded that meditation can affect plasma melatonin levels.

The purpose of a research study done by Arcari (1996) was to study the efficacy of a holistic, self-reflective approach to changing behavior and decreasing smoking in a workplace setting. This study tested whether subjects who learned mindfulness meditation reported significantly different levels of anxiety, depression, distress, and number of cigarettes smoked, and demonstrated lower cotinine levels than subjects who learn only cognitive-behavioral strategies. Test subjects demonstrated significantly lower cotinine, depression, distress, and number of cigarettes smoked and nine subjects quit smoking during the intervention.

Severtsen & Bruya (1986) studied the effects of two stress-reducing wellness activities, meditation and aerobic exercise, on electroencephalogram (EEG) patterns of normal subjects. Meditation and aerobic activity were associated with a perception of increased ability to cope and a generally positive feeling about the value of exercise and meditation in their lives, while there were no significant changes in EEG patterns.

Zakutney (1989) investigated a transcendental meditation (TM) technique as a positive health action. Three predominant themes emerged: (a) reduction in the effects of stress, (b) increase in awareness of self and environment and (c) emergence of progressive effects that result from the practice. These themes reflected the changes in attitudes and behavior regarding health that were described by the subjects. Subjects

reported an increase of self-efficacy as a result of practicing TM. The conclusion drawn from this study was that the practice of TM was a positive health action that affected other lifestyle changes of the respondents. Respondents reported that they continued the practice of TM because of the positive benefits that resulted.

Astin (1997) conducted a study to examine the effects of an 8-week stress reduction program based on training in mindfulness meditation. Studied was the effects of meditation on psychological symptomatology for stress, sense of control, and spiritual experiences. Twenty-eight individuals volunteered to participate in the study and were randomized into either an experimental group or a nonintervention control group. The experimental group was trained in mindfulness meditation, and the control group was not. Following participation, experimental subjects, when compared with controls, evidenced significantly greater changes in terms of: (1) reductions in overall psychological symptomatology; (2) increase in overall domain-specific sense of control and utilization of an accepting or yielding mode of control in their lives, and (3) higher scores on a measure of spiritual experiences. The techniques of mindfulness meditation, with their emphasis on developing detached observation and awareness of the contents of consciousness, may represent a powerful cognitive behavioral coping strategy for transforming the ways in which we respond to life events. They may also have potential for relapse prevention in affective disorders.

In a randomized, wait-list controlled trial, Speca, Carlson, Goodey & Angen (2000) studied the effects of participation in a mindfulness meditation-based, stress reduction program on mood disturbance and symptoms of stress in cancer outpatients. Ninety patients (mean age, 51 years) completed the study. After the intervention, patients

in the treatment group had significantly lower scores on Total Mood Disturbance and subscales of depression, anxiety, anger, and confusion and more vigor than control subjects. The treatment group also had fewer overall symptoms of stress; fewer cardiopulmonary and gastrointestinal symptoms; less emotional irritability, depression, and cognitive disorganization; and fewer habitual patterns of stress. Overall reduction in Total Mood Disturbance was 65%, with a 31% reduction in symptoms of stress.

An article by Roth and Creaser (1997) describes a bilingual mindfulness meditation-based stress reduction program in an inner-city setting. Mindfulness meditation is defined, and the practices of breathing meditation, eating meditation, walking meditation, and mindful yoga are described. Statistically significant decreases in medical and psychological symptoms and improvement in self-esteem were found. Many program completers reported dramatic changes in attitudes, beliefs, habits, and behaviors.

Study Rationale and Definitions

It appears that while CAI has been used to teach health behaviors, there have been no apparent publications about it being used to present meditation as a lesson or to present meditation as a method for stress reduction. Neither, does it appear that CMC in the form of WBI as a method for teaching meditation for stress reduction been studied. Because of this, it was decided that this study would examine the development and testing of an Internet Web site used to present meditation as a method for stress reduction. It was assumed that the Internet was an adequate tool for communication when used for health education and health promotion and so the Internet could be used to present a Web Based

Information System (WBIS) for meditation as a method for stress reduction has been studied.

Definitions

Word	Definition
Stress	A nonspecific response of the body to any demand made upon it. (Selye, 1974)
Eustress	Harmless, pleasant stress. (Selye, 1974)
Distress	Harmful, unpleasant stress. (Selye, 1974)
Stressor	That which produces stress. (Selye, 1974)
Computer Based Instruction	A learning system that employs computer technology to assist an instructor with teaching or guiding the learning program of individual students. Its main components consist of Computer Assisted Instruction (CAI), Computer Managed Instruction (CMI) and Computer Mediated Communication (CMC), each of which may employ a variety of computer based media. (Szabo, 2000)
Computer Assisted Instruction	A component of Computer Based Instruction that employs instruction modes of tutorial, review and practice, and simulation. (Szabo, 2000)
Computer Managed Instruction	A component of Computer Based Instruction that includes diagnostic assessment and prescriptive study assignments. (Szabo, 2000)
Computer Mediated Communication	A component of Computer Based Instruction that uses a computer to communicate information, both synchronously and asynchronously with a learner. (Szabo, 2000)
Web Based Instruction	A form of Computer Mediated Communication that uses a Web Browser. (Szabo, 2000)
Meditation	The process of perceiving directly the right inward measure of one's own being through careful, non-judgmental self observation. Kabat-Zinn, 1991)
Relaxation Response	A constellation of psychological and physiological effects that appear common to many practices: meditation, prayer; progressive relaxation, autogenic training, and the presuggestion phase of hypnosis and yoga. (Benson,

Word	Definition
	1975)
Internet	Is defined as an electronic "backbone" by which various computer networks link up with each other. (Jones, 1998)
Internet Search Portals	An Internet based searchable index of web sites and universal information. (Jones, 1998)
Lesson	An amount of teaching given at one time. (Oxford American Dictionary, 1980)

Chapter Three

Methods

Research Design

The research questions that helped guide this research are:

a) Among Internet users, what is the level of interest in a Web Based Lesson for the use of meditation as a method for stress reduction?

b) Among those participating in the learning system, what is their degree of satisfaction with this experience?

c) Did the lesson in meditation help respondents reduce stress?

d) What can be learned about the future applications of the components of Web Based Instruction as a method for enhancing positive health behaviors.

The overall purpose of this study was to develop and test a brief Internet based learning system in using meditation as a method for stress reduction.

The objectives for this study were:

a) To create and study the use of a Web Based learning system using meditation as an aid in stress reduction, over a 4 month period.

b) To assess the usefulness of a Web Based learning system for meditation presented on a global basis over the Internet.

Development of the Web Site

The web site for this project was completely designed, constructed and managed by the Principal Investigator from a basic prototype that initially operated as a test web site. The test web site operated from June 1, 2000 until July 15, 2000. It was used to refine the search identifiers that helped participants locate the production web site after it was activated. Development was done using HTML 4.0 code.

The production web site was originally designed using Microsoft's Frontpage 2000™, a WSYWIG (what you see is what you get) web development program. During testing, initial use of the site revealed that Microsoft Frontpage ™code did not appear correctly in any web browser but Microsoft's Internet Explorer™. In fact, in Netscape, version 3, it appeared as blank pages.

The lesson in meditation was initially created using Microsoft Powerpoint™ and then the generated slides were converted to HTML frames. This was done to allow for an easily accessed sidebar menu, and accurate presentation of additional notes that originally accompanied the text. The same problem was encountered with the lesson. It too did not appear to work properly in any version of Netscape™.

Design using Microsoft's software was abandoned and development for the production Web site was redone using Allaire's Homesite™ product, a universal HTML software based editor. Testing was done using version 3 and newer for both Netscape™ and Internet Explorer™. It was found that functionality for the redeveloped web site and lesson was equal for Netscape™ version 3, Internet Explorer™ version 3 and Opera™ (a popular commercial Internet product) browsers and subsequently, production phase for

the web site and lesson was begun. True data collection began on July 18, 2000 with the first completed lesson and interview and concluded on November 18, 2000.

Searching the Internet

Internet searching is the primary way users of the Internet obtain information from the World Wide Web . This is done through keyword searching utilizing a number of web based search engines. These search engines operate by using either human or robotic means to index each web site on the World Wide Web . A person who develops a web site and wants their web site to be searchable using these search engines must submit a description of their web site to each one. They can do this by either submitting to a commercial enterprise that does the registration work for the developer to thousands of search engines, by submitting to a free service that does the same, but for a limited number of search engines, or to each search engine on an individual basis which is also free but done by the developer. This researcher used the free methods since there were 1-4 hits on the web site each day without commercial intervention, and it was felt that without commercial registration, there would still be a large enough number of users to obtain a usable data set.

Before submitting the pertinent information that each search engine needs to add a web site to its database, a web site developer should write code that will identify his/her site to these search engines. This code is placed at the beginning of each web page and is included in a form of HTML tag called a metatag. Metatags are used to embed special information about the document into the header of the document. It is this information that the various web based search engines use to find and index a web site.

Making the Web Site Searchable

When finding information on the Internet, unless you have a specific Universal Resource Locator (URL), you are dependent on using one of the various available search engines. Search engine companies such as Lycos or Infoseek, use robot generated indexing, while others like Alta Vista index manually. This means that a robot, as opposed to a human driven process requires different coding to help index a web page. What follows below is the progressive Metatag coding done to aid searching for this project. There were 3 versions:

1) The test web initial search identifiers were as follows:

<meta http-equiv=Content-Type content="text/html; charset=windows-1252">

<meta name=ProgId content=PowerPoint.Slide>

<meta name=Generator content="Microsoft PowerPoint 9">

The testing revealed that hits on the web page were not adequate, (0-1/day) so the metatags were reassessed and updated to:

2) <META name="description" content="Stress is a part of every life. Hans Selye said "Life without stress is death." This site gives instruction for an alternative method to relieve stress. This method is Buddhist meditation and if done correctly, is not only an exercise in enlightenment, but in relaxation as well.">

<META name="keywords" content="mental health, patient education, stress, relief, meditation, alternative methods, stress relief, Buddhist meditation, selye, hans, hans Selye, relaxation,relaxation exercise, depression, anxiety, drug abuse, sleep disorders, drug use, neurotransmitter imbalance, health">

This provided more hits (1-2 most days), but these were sporadic so the third and final iteration was:

3) <META name="keywords" content="stress meditation Buddhist meditation selye hans education health teach teaching research study">

<META NAME="description" content="Stress is a part of every life. Hans Selye said "Life without stress is death." This site gives instruction for an alternative method to relieve stress. This method is Buddhist meditation and if done correctly, is not only an exercise in enlightenment, but in relaxation as well.">

<META NAME="copyright" CONTENT="(c) 2000, University of Alberta">

<META NAME="author" CONTENT="James Vincent">

<META NAME="revisit-after" CONTENT="1 day">

<META NAME="rating" CONTENT="General">

<META NAME="DC.Title" CONTENT="Stress Meditation Practice for Stress Relief as a Health Teaching Research Study">

<META NAME="DC.Creator" CONTENT="James Vincent">

<META NAME="DC.Description" CONTENT="Stress is a part of every life. Hans Selye said "Life without stress is death." This site gives instruction for an alternative method to relieve stress. This method is Buddhist meditation and if done correctly, is not only an exercise in enlightenment, but in relaxation as well.">

<META NAME="DC.Publisher" CONTENT="James Vincent">

This resulted in an average of 2 hits per day on a daily basis. This version spoke more specifically to the robot search engines which are more widely used and do not have the influence of human interpretation.

Search Engine Registration

The next thing that needed to be done was to register the web site with the various search engines. This is required if a site is to be indexed and added to each search engine database. This was done on a monthly basis. During the testing period, this was conducted manually, by visiting each search engine main page and filling out the registration forms. After the testing period, free registration was performed by a company called Add Me. The web site was registered by them with 35 different search engines.

Other changes that were instituted over the test period were:

1. A print icon that was connected to an Adobe Acrobat version of the lesson was added to the first page of the No-Consent branch of the web, to allow those who were not consenting to be part of the study the option of printing the lesson immediately without having to go through each lesson page or the option of taking the lesson online. Neither option included surveys.
2. A link to Adobe Reader was added to make it easier to obtain the Adobe reader software for those wanting to print the Adobe version of the lesson.
3. Default font was changed from verdana to garamond when it was learned that some versions of Netscape and IE did not read verdana font correctly, or some PC's did not have verdana installed.

Development of the Lesson

The initial version of the web based lesson was developed as a Microsoft Powerpoint 2000, 18 slide presentation that was converted to a frames based html file.

This was done as a quick way to include a side menu and notes for each section of the lesson. As mentioned, during testing it was discovered that in the Netscape browser, this version did not work properly. It was decided that in order to fix this it was best to code in Html version 4.0 and not use MS Powerpoint. The lesson was divided into 18 web pages based on lesson flow and logical presentation. Each page corresponded to each Powerpoint slide. The lesson then worked in all versions 3 and newer for Netscape and Internet Explorer.

Computer Software

Windows NT™ 4.0 with Internet Information Server™ 4.0, were used to operate the web server. Norton's pcAnywhere™ version 8.0 was installed to allow for remote desktop access for the researcher. Remote desktop access was important in that it allowed for file copying, log examination and saving, and IIS 4.0 restarts when necessary. It is interesting to note that it was not necessary to restart IIS 4.0 from a distance at any time during the study.

After the above software was installed on the server, the Web site was installed. As previously stated, the site was constructed using the Web programming language, HTML 4.0 and Allaire Homesite™ 4.0 The cost of this software is outlined in Appendix C.

Computer Hardware

A PC computer with a Pentium Intel 233 MMX CPU, 128 Megabytes of RAM, 512 Kilobytes of L2 cache memory, a 10 Gigabyte hard drive and a 10/100 megabit

network interface card was built for the project. A second network interface card was installed and used to manage an internal network that was connected to a development and testing computer where the web site was created and tested before entering production. The cost of this hardware is outlined in Appendix C.

Internet Access

A Small Office Home Office ADSL package was purchased from an Edmonton based ADSL reseller, Interbaun Inc. to ensure that the web server would have 24 hour seven day a week access to the Internet. This package included 2 static Internet Protocol (IP) addresses, one which was necessary for the registration of the research web site. A File Transfer Protocol (FTP) site was also setup and was used for long distance file access and file installation for the web site.

Web Site Design

Initial Web Design Flowchart:

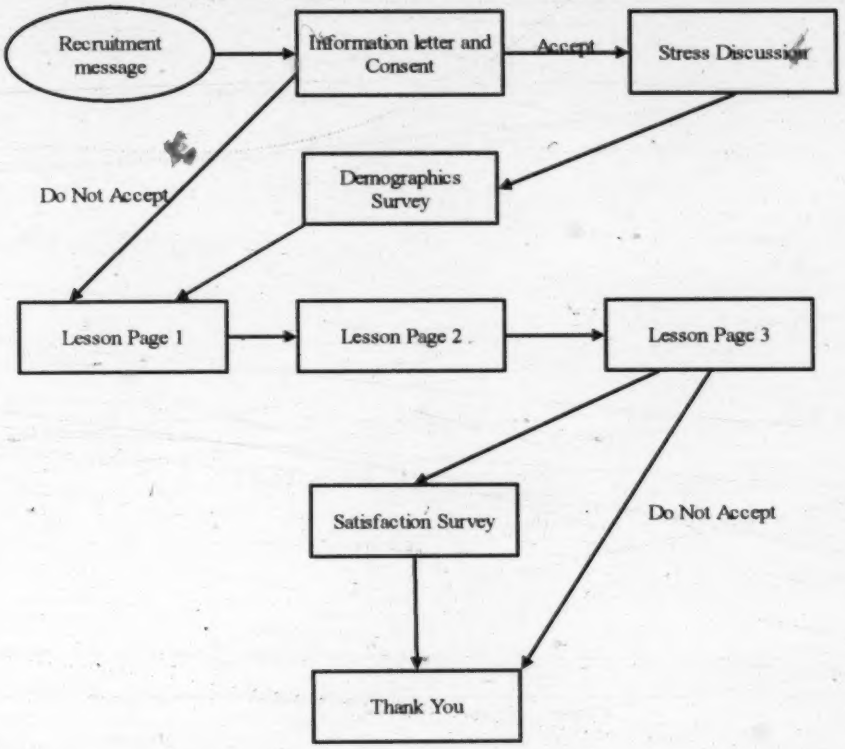

Figure 1: Initial Web Design Flowchart

The above figure is described below:

a) Recruitment message: Contained the title, a short recruitment message (reading level: grade seven), and a link to the information letter and consent form as outlined by the University of Alberta Health Research Ethics Board.

b) Information Letter and Informed consent: Was designed to the exact specifications of the University of Alberta Health research Ethics Board. Decision Options: 1) Accept (linked to Stress Discussion) and 2) Do Not Accept (linked to the lesson, but without the surveys).

c) Demographics Survey: Was very short in order to attract subject to use the lesson and obtain essential information on the participants.

d) Lesson Page 1:

e) Lesson Page 2:

f) Lesson Page 3:

g) Exit Survey: Also short.

h) Thank You page.

The final web site design was:

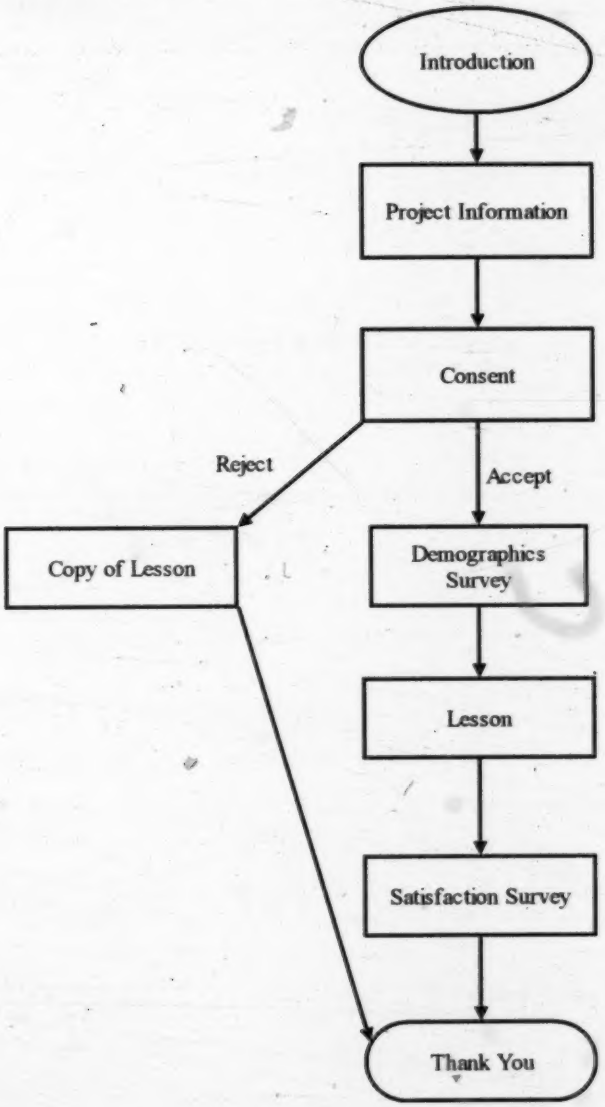

Figure 2: Final Web Design Flowchart

The above figure is described below:

a) Introduction: Contained the title, a short recruitment message (reading level: grade seven), and a link to the Project Information page.

b) Project Information: Contained a complete description of the project including what was expected of those who chose to consent to taking the lesson and surveys, contact information about the researcher, third party contact information, and a confidentiality statement. This page linked to the consent page.

c) Consent: A web based copy of the University of Alberta Ethics Committee approved consent form with a link to the first survey and lesson labeled "Accept", and a link to the lesson only labeled "Reject".

d) Copy of the lesson: This was an identical copy of the meditation lesson that was given to those respondents who consented to take part in the study. It linked to the same last page (Thank You) as did the second survey given only to those who consented to be part of the study.

e) Demographics survey: This was accessed by those who clicked on the "Accept" link after consenting to become part of the study. As explained below, this was served from a separate Web server than was the Meditation Lesson.

f) The Lesson: The lesson was separated into 18 hypertext linked Web pages, based on timing and change of focus for the lesson. Only one graphic was used to illustrate the meditation seating position from a lateral viewpoint.

g) Satisfaction Survey: Was compiled from researcher supplied content and served across the Internet from the same server as was the Demographics survey.

h) Thank You: As the end page for the Web site, this page contained 3 Hypertext links: 1) A link to the University of Alberta Web site, 2) A link to an Adobe Acrobat file version of the Meditation Lesson designed for printing, and 3) A link to the download file for the Adobe Acrobat Reader to allow easy access to the reader for those participants who didn't have a copy.

Intervention: A Web Based Information System (WBIS) on Meditation for Stress Relief

The intervention was a lesson in the use of Buddhist Meditation as a tool for stress reduction. This lesson is defined within the definition of WBI, in that there is some discussion surrounding whether or nor WBI is instructional or constructivist with or without elements of interactivity. The WBIS in Meditation is again, not interactive, but does have components that are instructional. The Universal Resource Locator (URL) for the lesson Web site was: http://www.life-stress.org. The following paragraph describes the lesson.

The content for the meditation lesson was edited by the principal investigator for this project, from a meditation course given by Theravada monks from a meditation centre outside Kandy, Sri Lanka. The principal investigator for this project used this content to design this WBIS to be simple and easy to use on a graphical as well as textual level. The

Meditation lesson is viewed as a component of the WBIS. As previously stated, there was included an Adobe .pdf version of the lesson for easy download and printing. Navigation of the web site was done from a tabled hypertext menu that supplied a link on each lesson page to the Home and Project Information pages. There were 3 pages that preceded the lesson. These were: 1) A Welcome page, 2) The Project Information page, and 3) The Consent page. 2 and 3 were required by the University of Alberta (see appendix A). There were 18 pages that comprised the lesson. Each represented a piece of new content and was identified as being distinct from the others by a title that identified the purpose of each piece. (see Appendix B). If a person decided not to participate in the study, they were automatically sent to the lesson, without having to take any surveys. They were not told this would happen, and if they wished to leave before experiencing the lesson they could choose to do so, at their own discretion, by closing their web browser. Data pertaining to whether or not they left the lesson was collected. Data pertaining to whether or not they completed the lesson was also collected.

Subjects

It is estimated, that there are at present, on a global basis, 374.9 million Internet users and that 40% of these live in Canada and the United States. Of this population, 84% have a greater than high school education, and a median income of $69,900 USD. English speaking Internet users for this study were self-selected based on their need for information on stress relief or meditation as they accessed and searched the Internet. (CyberAtlas, 2000).

Sampling

Selection was done by self- selection, having assumed that each subject was motivated to reduce, or better understand personal stress as it affected their lives. The production site experienced 1- 4 hits per day. Over the study period of 4 months, there was a total of 230 "hits" with a total of 120 self-selected respondents who consented to the study. 110 (the difference between 230 and 120), potential subjects did not go beyond the first page of the web site and so did not select to consent to the study. As a result, because they were not self-selected, they were not considered to be part of the study group. There were 22 respondents who went beyond the first page of the web site, did not consent to be part of the study, yet took the lesson. Although this number is reported, they too were not self-selected and are not considered part of the study. Thus, the total n for this project is 120 self-selected respondents, who consented to be a part of the study. Of this n of 120, all answered the demographics survey but, only 75 of this group of 120 self-selected respondents answered the satisfaction survey. Coincidentally, the best estimate done for minimum useful number of completed surveys was 120.

Recruitment

a) 35 different Internet Search portals: such as Yahoo™, Metacrawler™, and Excite™ using HTML metatag coding were utilized by registering the site's Universal Resource Locator (URL) with each search engine.

Data Collection

Data collection was done entirely through the web site and as such, done electronically. The areas of data collection were:

a) Demographics Survey (At beginning of lesson): Each visitor was asked:
   - Age: (select list) 18-30 years, 31-40 years, 41-50 years, 51-60 years, 61-70 years, 71-80 years, and > 80 years.
   - Gender: (select list) Male or Female.
   - How many times have you visited this site? (number entry)

b) Satisfaction Survey (at end of lesson):
   - Statement 1) 5 Point Likert Scale. "I found this lesson easy to understand and use."
     - 1=Strongly agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly disagree.
   - Statement 2) 5 Point Likert Scale. "This lesson was applicable to my needs."
     - 1=Strongly agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly disagree.
   - Statement 3) 5 Point Likert Scale. "The learning I experienced was valuable."
     - 1=Strongly agree, 2=Agree, 3=Neutral, 4=Disagree, 5=Strongly disagree.
   - Statement 4) Select list. "I would like to see more lessons like this one."
     - Yes, No.
   - Statement 5) Select list. "I would recommend this lesson to others."
     - Yes, No.
   - Statement 6) Select list. "If this is not your first visit to this site, has this lesson helped you reduce stress?"
     - Yes, No.

- Statement 7) "If you wish, please enter comments in the space below."
    - Open text entry.
- Statement 8) "If you wish, please enter your email address and I will contact you for a follow up survey in 1 month."
    - Open text entry.

c) Usage Data (concurrent by time, not aware to participant):

d) Total hits per day, over a 3 months time period

- Total number of times the lesson was completed.
- Total time per hit spent on the Web site.
- Total time per completed lesson.

Surveys

Both the demographics and satisfaction surveys were installed on a web server that was separate from the Meditation Lesson. The content for each of these surveys was supplied by the researcher and entered into the survey application using an Active Server Page based toolkit that formed the Web based interface. Data collection was done electronically and automatically across the Internet and was saved in a MS Access database. The server this data was stored was password secured and behind a UNIX based BSD firewall. It was backed up daily and a copy was taken off site to the researcher's office where it was stored for analysis. At no time was there any information collected that could have been used to identify any of the project's participants. Security was enhanced by collecting the survey data to a separate server from the lesson. Any person who attempted to access this data was required to not only be authenticated to the

server where it was stored, but had to have access through the firewall which was setup to prevent port scanning and entry by unauthenticated persons.

Analysis

a) Demographic Survey data: Was electronically collected in a MS Access database as descriptive data and used to describe the population.

- Age: Total number of respondents for each of the 8 groups of age ranges identified above were counted and recorded. These numbers are graphically represented for modal comparison between age groups.
- Gender: Total number of respondents for each of the 2 groups identified above were counted and recorded. These numbers were graphically represented for modal comparison between sex groups.
- Repeated Site visits: Frequencies received for the two available responses have been counted and graphically represented for modal comparison.

b) Satisfaction Survey data:

- Statements 1-3

  Were examined for total number of responses per Likert Scale point. Percentages were calculated for the total number of responses for each statement and reported in order. Success or failure of the lesson to deliver satisfaction were assumed to correlate with the higher percentages along each end of the statement scale.

- Statements 4-6

Responses were counted and have been graphically represented for modal comparison.

c) Usage data:

- Usage data was collected using the Microsoft Internet Information Server™ 4.0 log files.
- Numbers were analyzed and descriptive reports generated, describing the mean times for each category described above.

d) Open-ended, text-based comments:

- Were too few to be considered usable for analysis.

Chapter Four

Results

Introduction

The results from this project are divided into 4 sections. The first section very briefly describes what was learned when developing the web site. The next section describes usage data. The third section describes the results and analysis for each survey . Finally the printing of the lesson is described.

Web Site Development

What was learned from this web development experience was first of all that testing should be done in as many potential environments as possible. This includes testing with user active browser versions (version 3 and newer appeared adequate), based on variations of cross browser platform web development tools. The Microsoft WYSIWYG tool, Frontpage was not useful for this project. Neither was a converted Powerpoint presentation. Best to use simple HTML.

Setting up a web site for searching is a labour intensive learning exercise, best done in tandem with a group registration company. This can be free, or cost dependent on the degree of service required. Free means that a company will register your Universal Resource Locator (URL) with a number of search engines using an auto script. If you

contract such a company, they will register your URL with all the search engines they index, as well as supply advice regarding metatag coding.

Usage

The total number of "hits" on the Web page was 230 over the entire 4 month period. Of these 120 consented to study the lesson. Of these 120 respondents, 45 finished the demographics survey only and 75 finished both the demographics and the satisfaction surveys. All 120 completed the lesson.

Another 22 people did not consent to completing the surveys, but did study the lesson. A total of 142 people used the lesson.

Site usage statistics for length of time using the site were collected by the Internet server logs. They were as follows:

Table 1

Usage (Time)

Statistic collected	Value
Mean time per hit spent on the Web site	8 minutes
Mean time to complete lesson	5.5 minutes
Total number of times the lesson was completed	142
Mean hits per day (4 months)	2

Table 1 shows that the average time each respondent spent connected to the web site was 8 minutes. The mean time to complete the lesson was 5.5 minutes. During the testing period, it was determined that to simply read through the entire web site lesson took an average time of 7 minutes. The average test time for reading the meditation lesson was 6 minutes. The mean times spent by actual respondents (Table 1)

is in accordance with the testing, indicating that the data collected from the satisfaction surveys is reasonable based on the assumption that at least 7 minutes is needed to complete and understand what was presented on the web site.

Survey Results

Demographics Survey

There were 75 female respondents and 45 males (Figure 1). Of this group of 120 subjects, 25 were between the ages of 18 – 30 years, 41 were between the ages of 31 – 40 years, 30 were between 41 – 50 years, 21 were between the ages of 51 – 70, and 3 were older than 70 years (Figure 4).

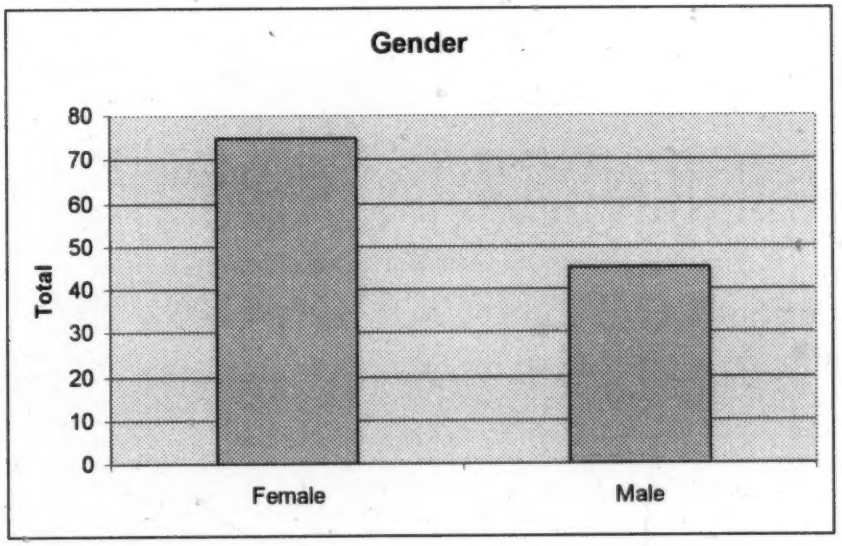

Figure 3: Gender

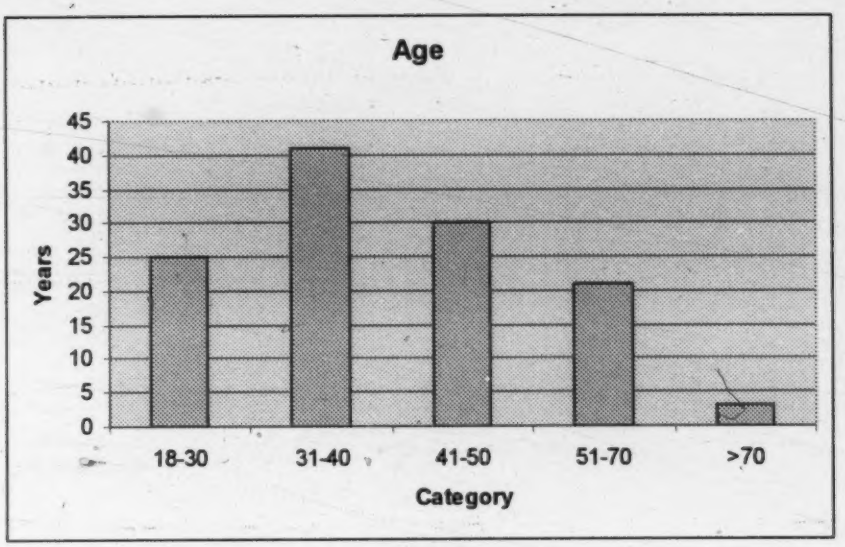

Figure 4: Age

Returned to Lesson

A number of these respondents returned to the lesson. 38 returned once, 13 returned twice, 6 returned three times, and 1 returned four times. None returned more than 4 times. The total times respondents returned to review the lesson was 58. Those that returned to the lesson did not do the Satisfaction Survey. 32 were female and 26 were male. The demographics for this group are outlined below in Table 2.

Table 2

Returned to Lesson (Demographics)

Age	Gender	Total	
18-30 years	Female	6	(5%)
18-30 years	Male	3	(2.5%)
31-40 years	Female	13	(10.8%)
31-40 years	Male	7	(5.8%)
41-50 years	Female	8	(6.6%)
41-50 years	Male	7	(5.8%)
51-70 years	Female	5	(4.1%)
51-70 years	Male	7	(5.8%)
>70 years	Female	0	(0%)
>70 years	Male	2	(1.6%)
Total		**58**	**(48 %)**

Table 2 indicates that the largest return group were 13 (16%) females, aged 31-40 years. The smallest return group was 2 (2%) males, aged >70. In total, almost half, (48%), of the 120 respondents returned to review the lesson at least once.

The Satisfaction Survey

There were seven questions in the satisfaction survey. See page 39 for the complete survey. The following tables represent the answers to these questions.

Table 3

Lesson was Easy to Understand

Response	Total	Percentage
Strongly Agree	28	37%
Agree	31	41%
Neutral	11	15%
Disagree	5	7%
Strongly Agree	0	0%
Total	**75**	**100%**

As can be seen in Table 3, the greater percentage of respondents felt the lesson was easy to understand (78% agreed or strongly agreed). A very small percentage disagreed (7%) and only 15% were neutral.

Table 4

Lesson was Applicable

Response	Total	Percentage
Strongly Agree	24	32%
Agree	34	46%
Neutral	13	17%
Disagree	4	5%
Strongly Agree	0	0%
Total	**75**	**100%**

As indicated by Table 4, a similar high percentage of respondents, (78%), felt the lesson was applicable. A much smaller percentage (5%) felt the lesson was not applicable and a moderate percentage (17%) were neutral.

Table 5

Lesson was Valuable

Response	Total	Percentage
Strongly Agree	22	29%
Agree	40	54%
Neutral	9	12%
Disagree	4	5%
Strongly Agree	0	0%
Total	**75**	**100%**

Table 5 indicates that the greater percentage of respondents (83%) agreed or strongly agreed that the meditation lesson was valuable. A low percentage (5%) felt it was not valuable and 12% were neutral.

Table 6

Like to See More Lessons Like This One

Response	Total	Percentage
Yes	68	91%
No	7	9%
Total	**75**	**100%**

A clear majority of those who took the satisfaction survey (91%) thought they would like to see more lessons and only 9% did not.

Table 7

Recommend Site to Others

Response	Total	Percentage
Yes	69	92%
No	6	8%
Total	**75**	**100%**

Table 7 clearly shows that 92%, another clear majority of respondents, would recommend the web site and lesson to others, indicating they saw value in referring others to take the lesson. Very few 8% felt they would not recommend the site to others.

Table 8

Helped Me Handle Stress

Response	Total	Percentage
Yes	63	84%
No	12	16%
Total	**75**	**100%**

It is noted in Table 8 that a high percentage (84%) of respondents felt the meditation lesson helped them control their stress, while 16% did not. While 84% is not as high as for the other survey questions, it is still clearly a high enough proportion to allow us to conclude that the lesson was helpful to a large majority of participants. It is important to note however, that since each respondent was answering the survey for the first time, presumably without using the lesson, their reduction in stress is an anticipated outcome, rather than one they have experienced.

Follow –up Survey

A follow-up survey was done 1 month post survey for 6 respondents who offered their email address for this purpose. The survey data for the three who returned to the web site to repeat the lesson was cataloged and not included in the group of 120. Two questions were asked: 1) Have you used the lesson in the past month? And, 2) If you did, did it help you reduce your stress levels?

Table 9

Follow-Up Survey Results

Respondent	Used Lesson	Helped Reduce Stress
1	Yes (printed version)	Yes
2	Yes	Yes
3	Yes (printed version)	Yes
4	Yes	Yes
5	No	N/A
6	Yes	Yes

It appears from Table 9, that for the 6 respondents that consented to a second survey, the lesson was accessed after the first time and the results from this experience as a whole was a favorable one, in that 5 out of 6 respondents used the lesson, and felt it helped to reduce their perceived stress levels.

Lessons Printed

Of the 22 who did not consent to take the surveys 21 printed the lesson. Of the 120 who consented to be part of the study, 36 printed the lesson. This is a total of 57 (40%) out of 142 total respondents who took the lesson.

Chapter Five

Discussion

Introduction

This project, as a whole, was derived from the need to understand what was required to create and assess a Web Based Information System in meditation for stress reduction as an exercise in health education and health promotion. Health education is considered to be a precursor to modern day health promotion and an integral part of what health promotion is today.

The objectives for this study were to create and study the use of a Web Based lesson in meditation as an aid in stress reduction over a 4 month period, and to assess the usefulness of a Web Based instructional lesson in meditation as it was presented on a global basis over the Internet.

The research questions that helped guide the research were:

a) Among Internet users, what is the level of interest in a WBIS in the use of meditation as a method for stress reduction?

b) Among those participating in the lesson, what was their degree of satisfaction with the lesson experience?

c) Did learning how to meditate help respondents reduce stress?

d) What can be learned about the future applications of WBIS as a method for enhancing positive health behaviors?

Meditation

Kabat-Zinn (1986) talks about the "evolution" of meditation as a method of treatment for various medical disorders. His stress reduction clinic at the University of Massachusetts Medical Centre uses meditation as its central treatment method for reducing stress. Herbert Benson (1975) has researched and applied the practice of meditation to what he calls the "Relaxation Response" a treatment regimen at the Hypertension Clinic at Beth Israel Hospital in Boston. Kabat-Zinn (1986) has found meditation is discretely associated with reduced anxiety. This study supports these findings in that data analyzed from the satisfaction surveys and the follow-up surveys indicates that stress levels were reduced in those participants who learned the meditation method taught by the online lesson. Benson's work, is slowly being adopted by medical community, an example of which is the University of Massachusetts' Stress reduction Clinic.

Zakutney (1989) found meditation to be a positive health action that affected his study subjects attitudes and behavior regarding their health. They were able to use meditation to reduce the effects of stress, and increase their awareness of self and their environment. They continued the practice of meditation after the study because of the positive benefits that resulted. The data as analyzed from this study supports these findings in that the data indicates respondents reported they anticipated they would be able to reduce stress and some reported they continued to use the meditation they learned to produce the beneficial results they experienced from the lesson.

Astin (1997) conducted a study to examine the effects of an 8-week stress reduction program based on training in mindfulness meditation. Studied was the effects of meditation on psychological symptomatology for stress, sense of control, and spiritual experiences. Following participation, experimental subjects, when compared with controls, evidenced significantly greater changes in terms of reduction in overall psychological symptomatology. This thesis study supports these findings in that the data indicates respondents reported they anticipated they would be able to reduce stress.

The techniques of mindfulness meditation, with their emphasis on developing detached observation and awareness of the contents of consciousness, may represent a powerful cognitive behavioral coping strategy for transforming the ways in which we respond to life events.

Level of Interest

After examining the pertinent data, it can safely be said that among those who participated in this study, that their level of interest in the WBIS in meditation appears to be reasonably high. In addition, nearly half of those who used the WBIS printed the lesson so they could presumably use it later. As well, all those who did not consent to being a part of the study took the lesson. Only one from this group did not print the lesson, indicating a high level of interest in the lesson from those who did not consent to take the surveys and be a part of the study. A high percentage also returned at least once to review the lesson, indicating a high level of interest.

But, taking into account the overall picture, why was it only 230 people out of an estimated 374.9 million Internet users (Cyberatlas, 2000) visited the project web site?

One answer to this question might be that the metatags for searching were not adequate, even though they were rewritten twice. The most likely explanation is that given that the best estimate of how many web sites there are is 60 million, it could be that the web site for this project was simply lost in the crowd.

During the test period for this study, it was determined that it took 7 minutes (mean time) to enter the web site, read all the required information, consent to be a study subject, do the surveys and take the lesson. The mean time spent on the web site by those subjects who finished both surveys was 8 minutes, and mean time to take the lesson was 5.5 minutes. This meant that 2.5 minutes were taken to peruse the rest of the web site, a reasonable time period. The fact that each subject spent the time needed to read the project information and consent forms, then consent to taking the study indicates that interest appeared to be high for them since they were spending more time than was needed to get the information (the lesson) that they desired.

Level of Satisfaction

As indicated by the data collected from the satisfaction survey, it was found that a high percentage agreed that the lesson was easy to use, applicable to their needs and was valuable to them. A high percentage would like to see more lessons, (presumable as part of a WBIS), would recommend the site to others, and felt the lesson would help them reduce their of stress levels. It appears that overall, the level of satisfaction experienced by those who responded to the satisfaction survey was high.

A high percentage of those respondents who completed the meditation lesson returned at least one more time and completed it again. It may be that this action indicates satisfaction with their initial encounter and some components required review.

As well, there were a number of respondents who were surveyed 1 month after taking the lesson. All but one had used the lesson within that month and found it reduced their levels of stress. This number is small, but does indicate satisfaction with the Web Based lesson.

Other Lessons

Out of the total people who found the project web site there was a large number, (230 vs 142, a difference of 88 (38%))who opened the home page and decided not to continue. In retrospect, it may have been of value to ask up front what was the discouraging factor that stopped these people from taking the lesson. A short, immediate exit survey could have been worked into the web site.

The number of respondents, considering the potential number, was low. This may have been a result of relying completely on the search function of the Internet for subjects. Registration for the web site was done by the principal investigator, an experienced Internet user and amateur web developer. There are a number of Internet based companies that offer paid for services in this area. In the future, it may be of value to hire a professional agent to perform this task and perhaps help bring more visitors to a site such as this one.

Limitations of the Study

The limitations for this study were primarily defined by the medium (the Internet) that was used to present the Web Based lesson. This necessitated that the sample be self selected, and that data be collected from an audience removed geographically from the project centre. While this was a limit, it presented a positive situation as well, in that data collection was a cost effective exercise, and access to the study was done on a global basis, 24 hours a day, 7 days a week. This is the nature of the Internet as it functions today.

Another limitation inherent in the methodology for the project, is that there was limited data gathered that described the stress levels of each respondent and whether or not they were affected by the lesson on a long term basis. The data regarding whether or not the lesson helped respondents to reduce stress levels is self-reported and measured anticipated reduction in stress. It is a limitation of this study that more in depth data was not collected regarding reduction of stress. Further research may be required to determine if a similar lesson can indeed help to reduce stress levels in a similar group.

Another limitation that may be inherent in this study is that there was no comparison done between this group, (who took a lesson in meditation using the internet), and a group who who could have taken the lesson using a different presentation format. The lesson might have been presented in a traditional classroom setting and compared to the internet group.

Suggestions for Further Research

In summary, although the number of respondents was low, a very high percentage of those that did respond experienced a high level of satisfaction with the lesson. All of those who did not consent to be subjects took the lesson, indicating an interest in the subject and perhaps its presentation format. One of the objectives for the study was to test the usefulness of the Web Based lesson as a health education and health promotion tool. It appears that a Web Based lesson could be a useful tool for health education and health promotion and as such requires further study. The lesson was successful in reducing anticipation of stress and so forms a template for further investigation. Demonstrated high levels of interest in the widely available access to health education that the Internet provides could form the basis for an entire section of health promotion that deals with the application of health education in the form of Web Based interactive lessons that are consumer centric. This requires more investigation, and it is hoped that this study can help to form a basis for further research in this area.

Further research could be done on promoting interactivity by adding a user's forum, designed to allow each respondent the option to communicate with others if they chose to do so. As well, an option that allowed the user to practice their learning before answering a survey and share this with other users via the forum might add a depth to the collected data that was not inherent in this project. In addition, respondents might be given an opportunity to pause during the lesson to practice what they learn regarding meditation.

In addition to the surveys done, a full, validated stress survey could have been added to this project, with a follow-up based on not only respondent interest, but attached to an incentive program that would attract respondents to repeat this survey. The advantage would be a larger comparative study that would test before and after groups and perhaps prove the effect (lowered stress) was the result of the practice of meditation.

Another enhancement to the study would be to add more lessons that used a similar, if not identical format, all with short, easy to use surveys designed to produce a data set that examined the effects of health education across a broad range of health related subjects. The hope would be to develop a synergy would be developed that together would have a greater overall effect on an individual's health as compared to a single lesson in a single period of time.

It would also be interesting to convert a number of educational pamphlets, (the kind a person might be given by their family physician), into a series of small, easy to use lessons. A publicly accessible touch screen computer could be set up in an obvious setting such as a doctor's office, and used to access this series of lessons and data would be collected regarding usage patterns and learning results. Repeat visits would be allowed at the discretion of the person's doctor.

Multimedia could also be added to the lessons with the hope that learning would be enhanced through a more extensive use of multiple senses, (sight, hearing, vison) and interactivity. Short periodic tests could be interspersed throughout each lesson to give feedback regarding understanding of the respondent and perhaps enhance their learning experience.

The above suggestions are based on the learning that resulted from this study. It is felt that this study has formed a good starting point for each of these, and that the results of this learning indicate opportunities for further research.

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Appendix A:

University of Alberta Information Requirements

Ethical considerations:

Each subject was required to indicate that they were completely informed about the research project before they were allowed to participate. To this end, the Web site contained:

Recruitment Message (First page of Web site)

Welcome.

What is stress? Stress is your body's way of responding to a difficult situation. A difficult situation can be anything that causes your body to respond, whether or not the difficult situation is happy or unhappy. A happy situation can cause as much stress as an unhappy one.

Stress is a part of life that no one is immune to. In fact, Hans Selye, the grandfather of stress research, is quoted as having said, "Without stress there is not life". How you react to stress is based on how much control you feel you have over your life plus the number of stressors you have to deal with. As the numbers go up, the difficult situations begin to "pile up" on each other. This "pile up" can say how severe your stress can become.

Inside this Web site is a short lesson on the use of meditation as a method to reduce stress. The lesson is based on an actual course in meditation, taught by the monks from a meditation center outside Kandy, in Sri Lanka.

This Web site is dedicated to stress education for those who feel its effects and want some control over it. It is the product of research and is part of a graduate student research project from the University of Alberta, Centre for Health Promotion Studies in Edmonton, Alberta, Canada. There are a couple of short surveys that you may choose to complete. If you do complete them, thank you. There is no cost and the many benefits you can reap from taking the lesson will be with you for your lifetime.

Project Information (Second Page of Web site)

Dear Participant,

The overall purpose of this study is to develop and test a brief Internet based lesson in the use of meditation as a method for stress reduction.

The Background for this study:

Stress appears to be a normal and necessary part of life. But when stress levels grow beyond a level that a person can manage, it becomes a problem that can affect both their mental and physical health. In time, this effect can be harmful. People want to learn how to understand stress and its effects as well as how to reduce stress. Stress reduction by meditation is a learned process that can reverse stress' harmful effects and as such

enhance an individual's health. Stress reduction can be taught in a formal manner, to a large population using a recent invention – the Internet.

Procedures:

Web Based Instructional lessons in Stress Reduction have not been well studied. For this reasons, it is assumed that this study will produce significant findings that will help you improve your health through a unique method of learning how to reduce stress. With this in mind, this study will develop and assess the use of a Web Based Instructional lesson presented to you over the Internet as a method for enabling you to better manage stress and in turn improve your health.

Benefits:

Should you participate in this study, you will have the advantage of being able to utilize the lesson as often as you like, from anywhere you have access to a computer that is connected to the Internet. As well, the lesson is portable in that you will be able to print or copy it to a floppy disk and carry it with you if you so choose. This flexibility of access means you are not restricted to use of the information by geographical location. Other benefits include a reduction in stress levels and hopefully an improvement in your quality of life.

Confidentiality:

- Your identity will not be collected by any physical or electronic means. Neither will it be reported in any presentation or publication of my findings. I will also ensure that your identity cannot be inferred from any of the same.
- The transcript of your responses to my questions will be shared only with my research supervisor, Dr. Doug Wilson.
- I will be responsible for safeguarding the survey data, which will be saved to CDROM, encrypted, and password-protected. All these electronic records of each survey will be stored in a locked filing cabinet in my office, in accordance with University of Alberta regulations.
- The information will be used only for the specified purpose. Any additional use of the information would require additional ethics approval from the University, and your written consent.
- There are no known risks.
- The project has received ethics approval from the University of Alberta.

Freedom to withdraw:

You are of course free to withdraw from this study at any point. If you wish to withdraw from the study please contact me or Dr. Wilson at any of the numbers given above. Following your withdrawal from the study I will destroy any versions of your surveys that may exist. If you wish to discuss any aspects of this study with someone who is not involved, you may contact: Helen Madill at helen.madill@ualberta.ca. Dr. Madill is not affiliated with this study.

Consent (Third page of Web site)

If you:

Understand that you have been asked to be in a research study,

Understand the benefits and risks involved in taking part in this research study,

Have had an opportunity to ask questions and discuss this study (see previous page),

Understand that you are free to refuse to participate or withdraw from this study at any time (you do not have to give a reason),

Have had the issue of confidentiality been explained to you (see previous page),

Understand who will have access to your records,

Then you may decide to take part in this study,

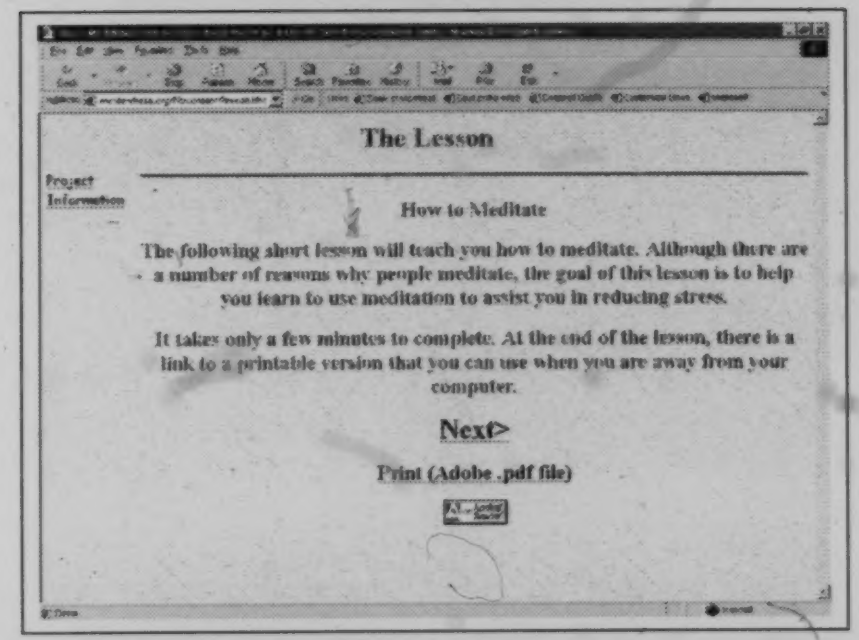
Please choose one of the following:(when using the surveys, please use the survey navigation buttons, and not the ones for your browser...Thank you.)

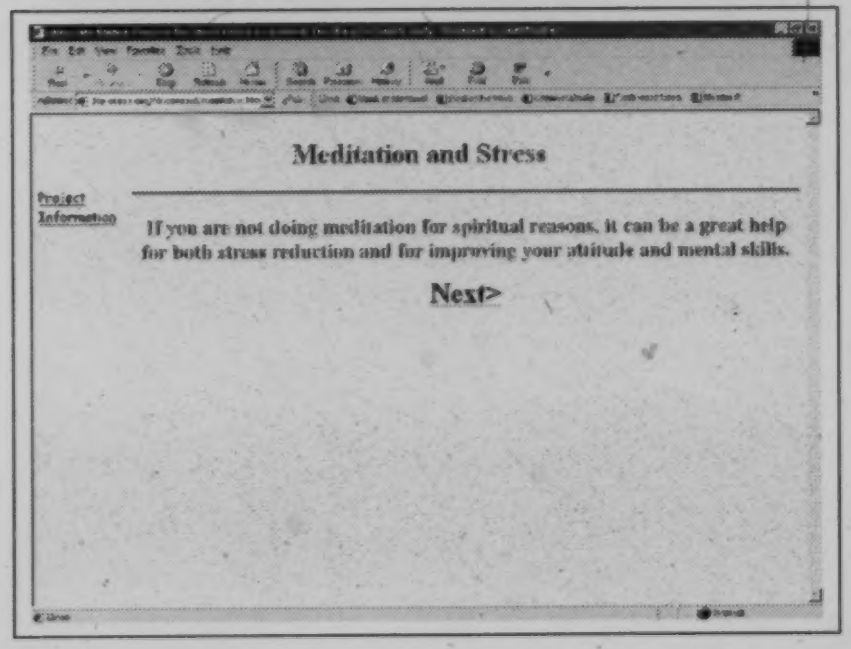
Accept

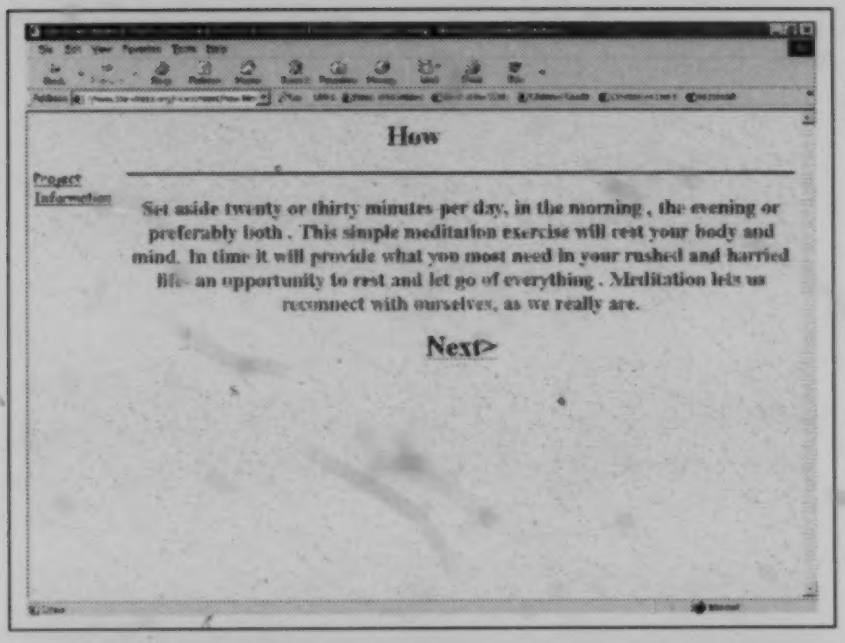
Reject

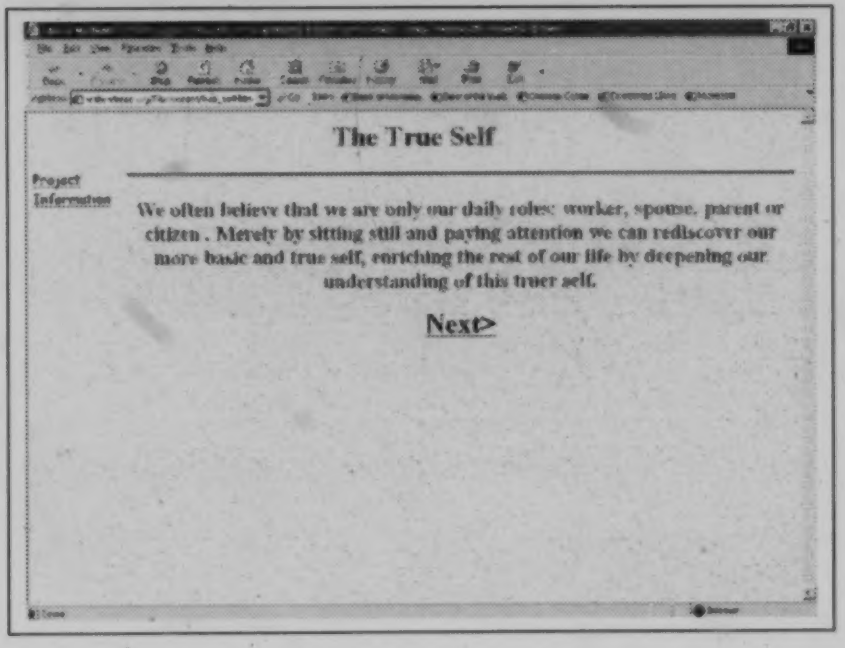
Appendix B:

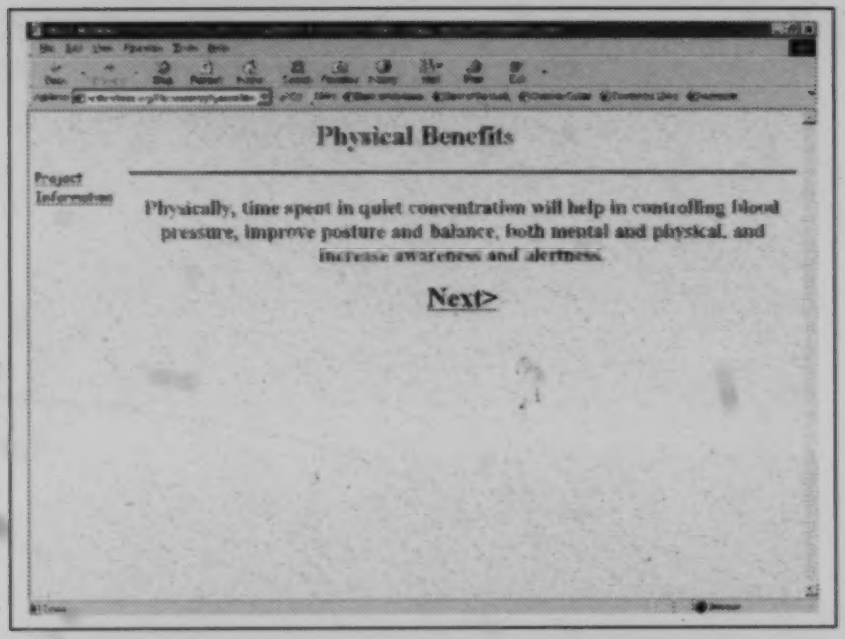
Screen Shots of Meditation Lesson

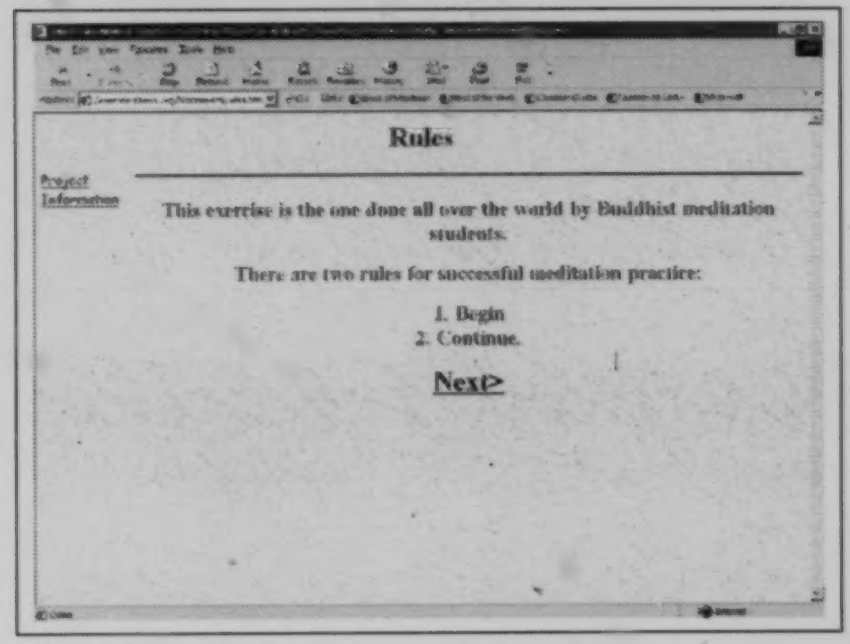

The Lesson
Project Information
How to Meditate
The following short lesson will teach you how to meditate. Although there are a number of reasons why people meditate, the goal of this lesson is to help you learn to use meditation to assist you in reducing stress.
It takes only a few minutes to complete. At the end of the lesson, there is a link to a printable version that you can use when you are away from your computer.
Next>
Print (Adobe .pdf file)

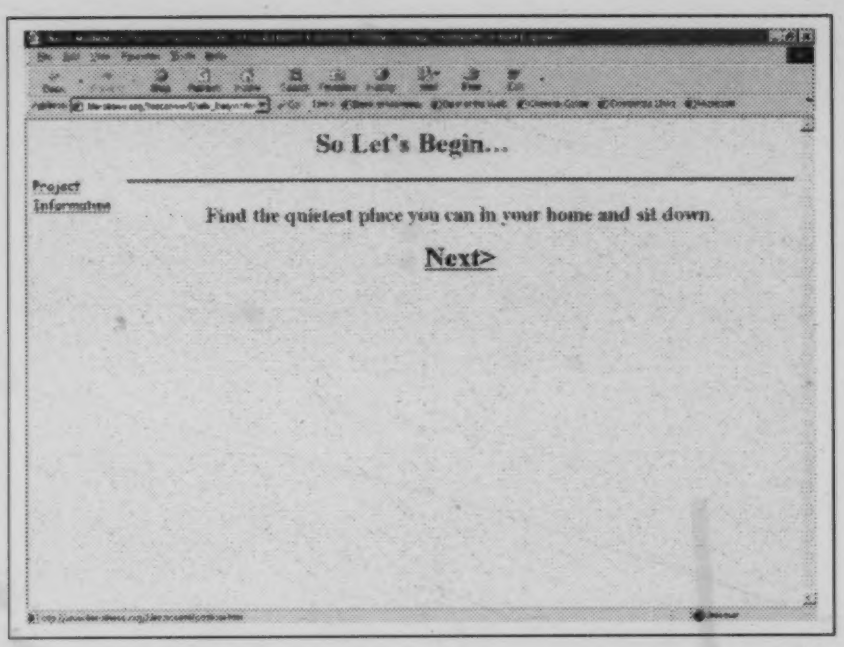

Meditation and Stress
Project Information
If you are not doing meditation for spiritual reasons, it can be a great help for both stress reduction and for improving your attitude and mental skills.
Next>

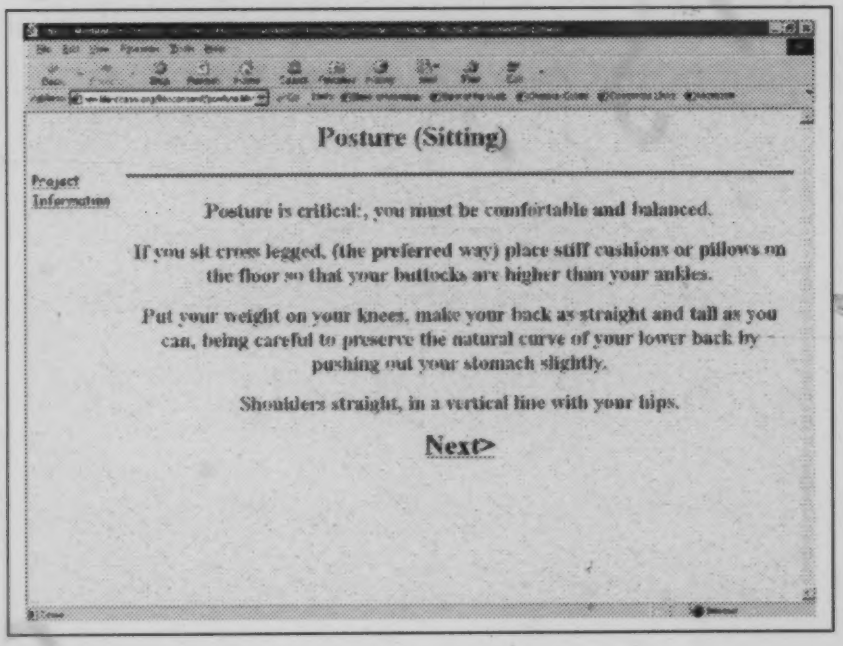

How
Project Information
Set aside twenty or thirty minutes per day, in the morning , the evening or preferably both . This simple meditation exercise will rest your body and mind. In time it will provide what you most need in your rushed and harried life- an opportunity to rest and let go of everything . Meditation lets us reconnect with ourselves, as we really are.
Next>

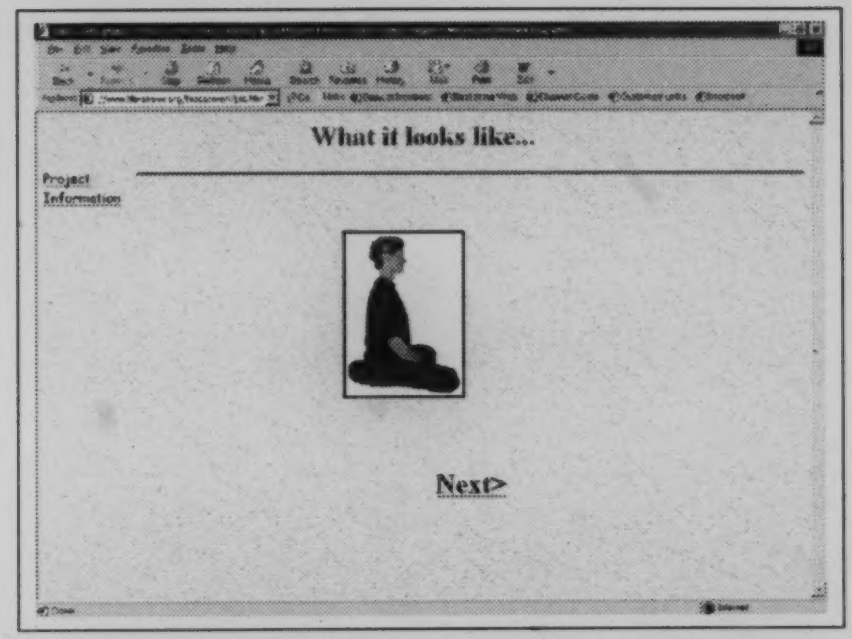

The True Self
Project Information
We often believe that we are only our daily roles: worker, spouse, parent or citizen . Merely by sitting still and paying attention we can rediscover our more basic and true self, enriching the rest of our life by deepening our understanding of this truer self.
Next>

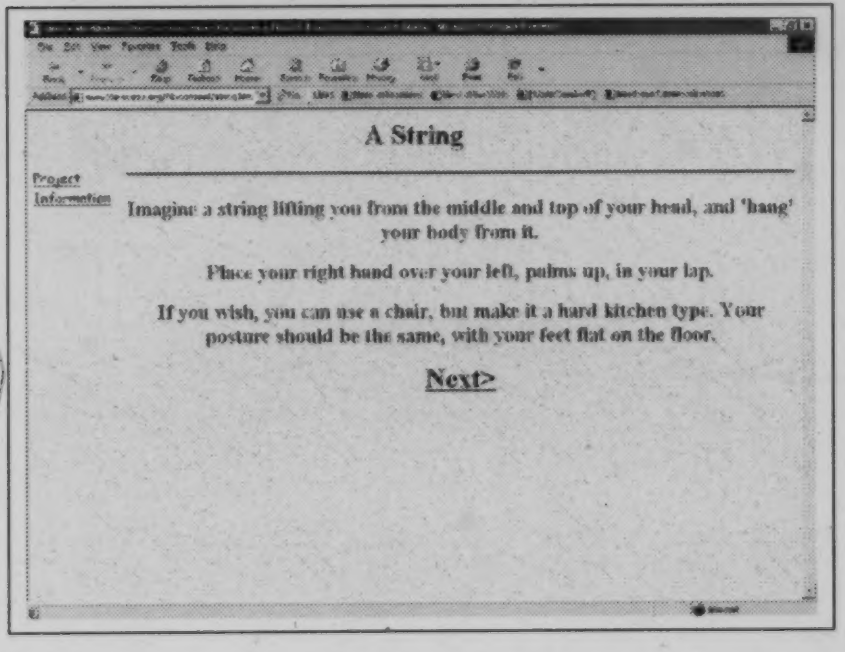

Physical Benefits
Project Information
Physically, time spent in quiet concentration will help in controlling blood pressure, improve posture and balance, both mental and physical, and increase awareness and alertness.
Next>

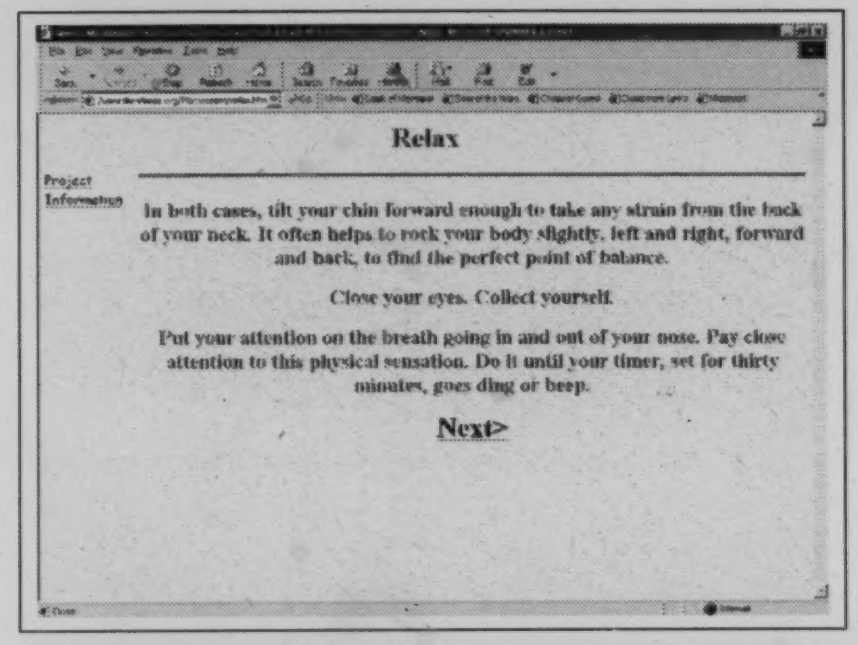

Rules
Project Information
This exercise is the one done all over the world by Buddhist meditation students.
There are two rules for successful meditation practice:
1. Begin
2. Continue.
Next>


So Let's Begin...
Project Information
Find the quietest place you can in your home and sit down.
Next>


Posture (Sitting)
Project Information
Posture is critical:, you must be comfortable and balanced.
If you sit cross legged, (the preferred way) place still cushions or pillows on the floor so that your buttocks are higher than your ankles.
Put your weight on your knees, make your back as straight and tall as you can, being careful to preserve the natural curve of your lower back by pushing out your stomach slightly.
Shoulders straight, in a vertical line with your hips.
Next>


What it looks like...
Project Information
Next>


A String
Project Information
Imagine a string lifting you from the middle and top of your head, and 'hang' your body from it.
Place your right hand over your left, palms up, in your lap.
If you wish, you can use a chair, but make it a hard kitchen type. Your posture should be the same, with your feet flat on the floor.
Next>


Relax
Project Information
In both cases, tilt your chin forward enough to take any strain from the back of your neck. It often helps to rock your body slightly, left and right, forward and back, to find the perfect point of balance.
Close your eyes. Collect yourself.
Put your attention on the breath going in and out of your nose. Pay close attention to this physical sensation. Do it until your timer, set for thirty minutes, goes ding or beep.
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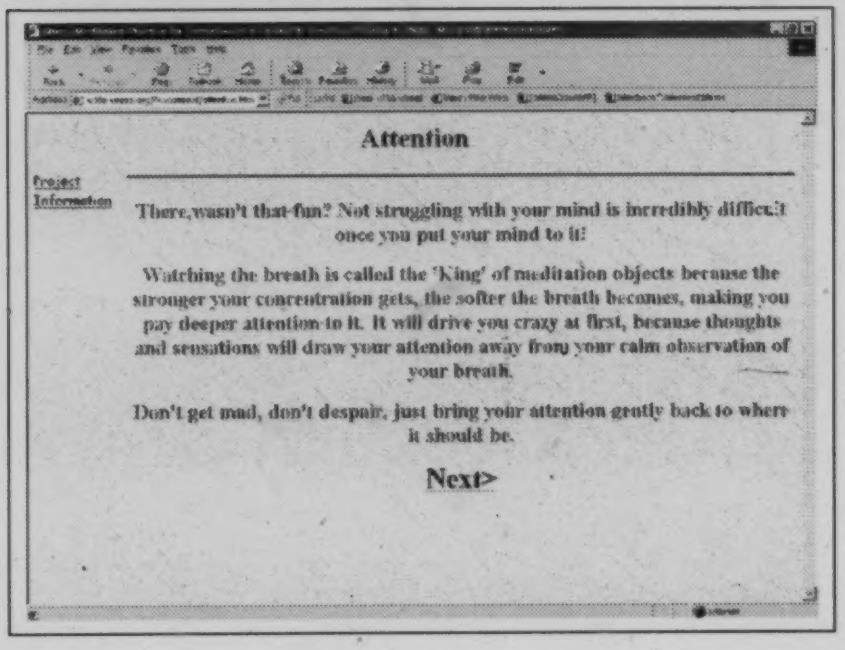
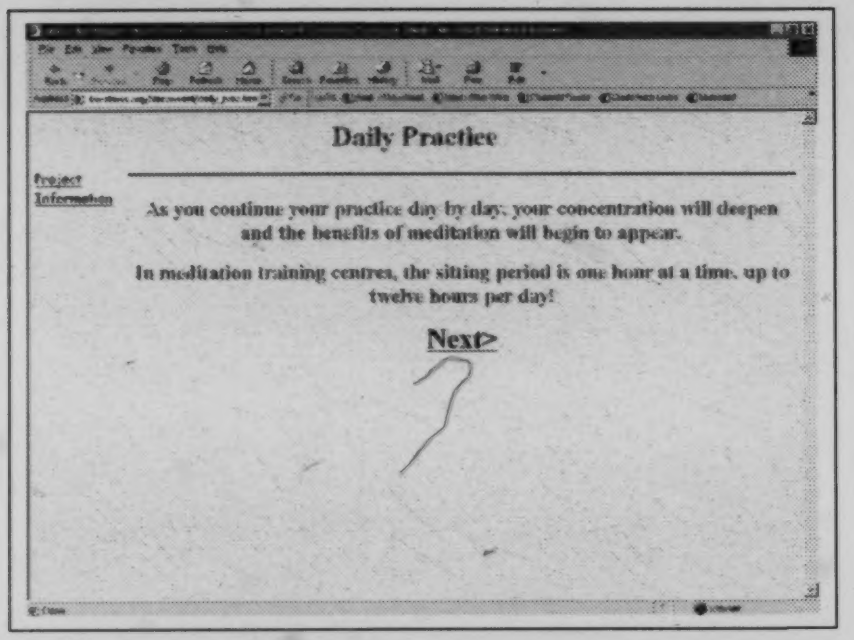
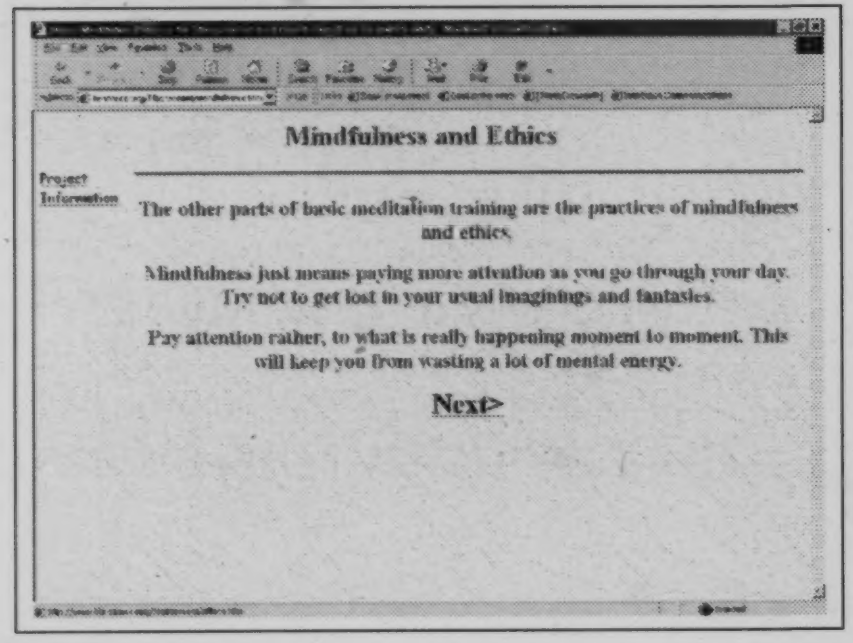

Attention
Project Information
There,wasn't that fun? Not struggling with your mind is incredibly difficult once you put your mind to it!
Watching the breath is called the 'King' of meditation objects because the stronger your concentration gets, the softer the breath becomes, making you pay deeper attention to it. It will drive you crazy at first, because thoughts and sensations will draw your attention away from your calm observation of your breath.
Don't get mad, don't despair, just bring your attention gently back to where it should be.
Next>


Daily Practice
Project Information
As you continue your practice day by day, your concentration will deepen and the benefits of meditation will begin to appear.
In meditation training centres, the sitting period is one hour at a time, up to twelve hours per day!
Next>


Mindfulness and Ethics
Project Information
The other parts of basic meditation training are the practices of mindfulness and ethics.
Mindfulness just means paying more attention as you go through your day. Try not to get lost in your usual imaginings and fantasies.
Pay attention rather, to what is really happening moment to moment. This will keep you from wasting a lot of mental energy.
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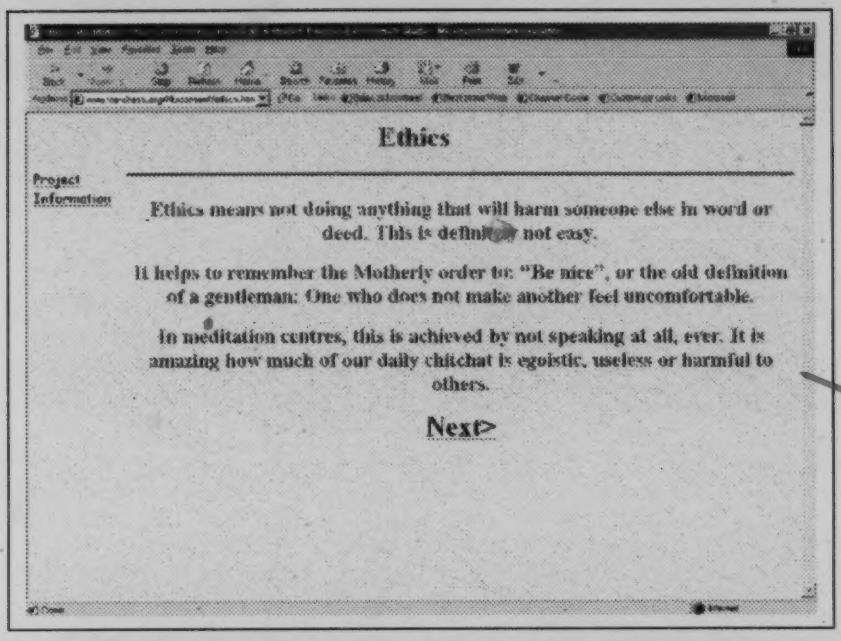
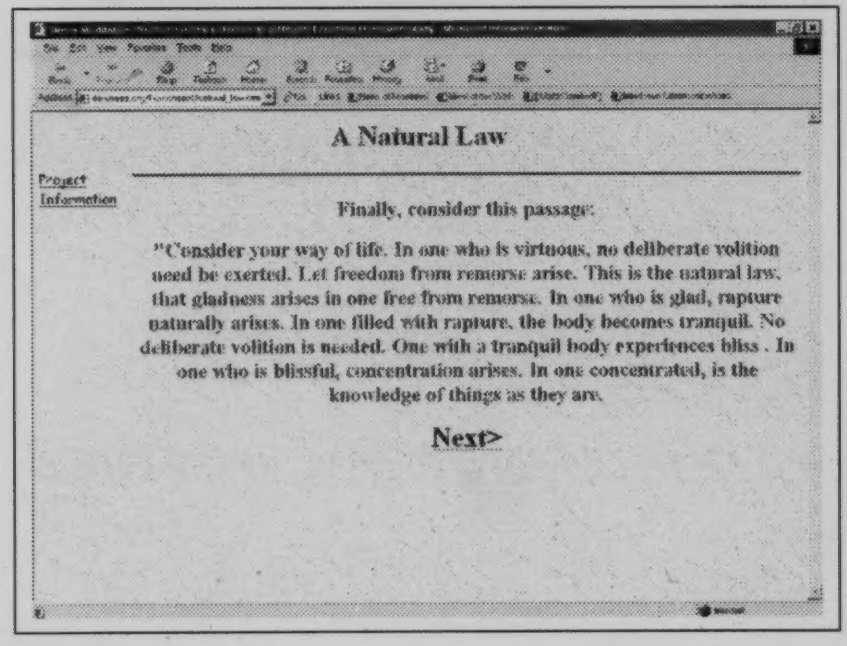

Ethics
Project Information
Ethics means not doing anything that will harm someone else in word or deed. This is definitely not easy.
It helps to remember the Motherly order to: "Be nice", or the old definition of a gentleman: One who does not make another feel uncomfortable.
In meditation centres, this is achieved by not speaking at all, ever. It is amazing how much of our daily chitchat is egoistic, useless or harmful to others.
Next>


A Natural Law
Project Information
Finally, consider this passage:
"Consider your way of life. In one who is virtuous, no deliberate volition need be exerted. Let freedom from remorse arise. This is the natural law, that gladness arises in one free from remorse. In one who is glad, rapture naturally arises. In one filled with rapture, the body becomes tranquil. No deliberate volition is needed. One with a tranquil body experiences bliss . In one who is blissful, concentration arises. In one concentrated, is the knowledge of things as they are.
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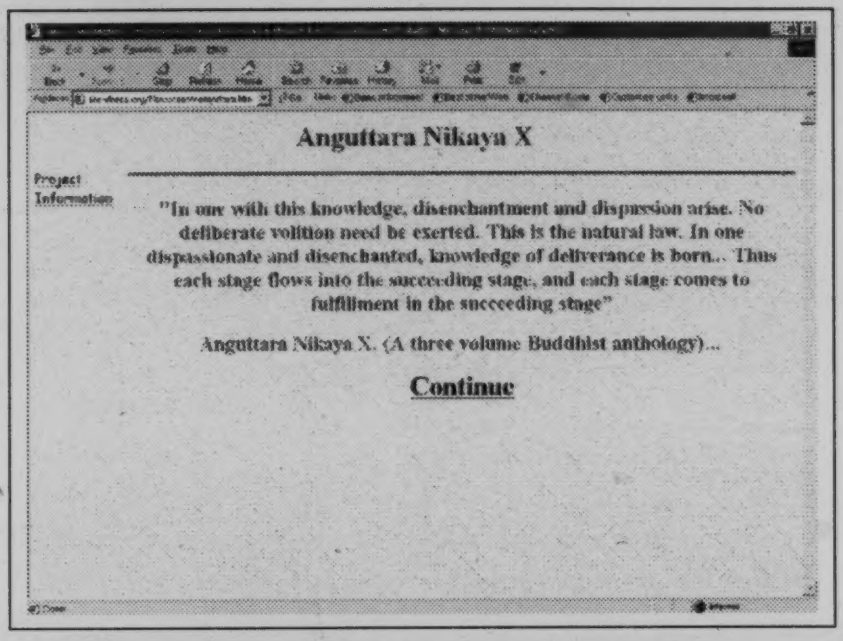
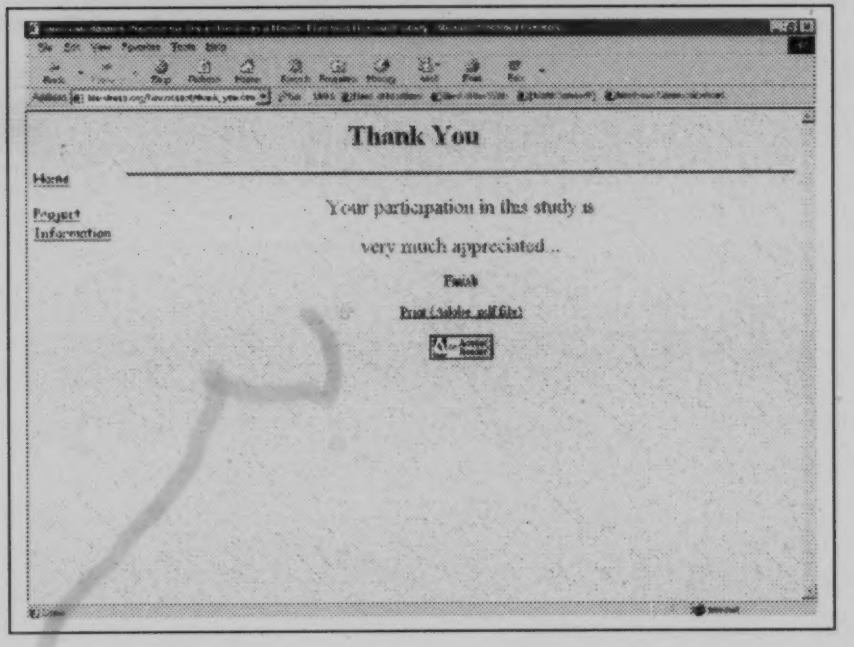

Anguttara Nikaya X
Project Information
"In one with this knowledge, disenchantment and dispassion arise. No deliberate volition need be exerted. This is the natural law. In one dispassionate and disenchanted, knowledge of deliverance is born... Thus each stage flows into the succeeding stage, and each stage comes to fulfillment in the succeeding stage"
Anguttara Nikaya X. (A three volume Buddhist anthology)...
Continue


Thank You
Home
Project Information
Your participation in this study is
very much appreciated...
Finish
Print (Adobe .pdf file)

Appendix C: Cost of Project

Hardware

Pentium 233MMX OEM CPU and MB		$129.00
128 MB168 pin SDRAM 10ns		$93.00
Samsung 10G HD		$141.00
Generic 40x IDE CD-ROM drive		$40.00
1.44 MB Floppy		$20.00
2x AOpen PCI 10/100bT NIC		$58.00
Generic SiS 4M PCI		$45.00
15" .28 Monitor		$189.00
ADSL Modem with SOHO Connection		$320.00
Setup		$60.00
Total		**$1095.00**

Software

Allaire HomeSite 4.5 (PC)		$165.00
MS Office 2000 Standard		$214.00
PC Anywhere 32 Host/Remote V9.2 (CD)		$143.00
MS NT 4.o server (used)		$550.00
Total		**$1072.00**

Time

Development of Lesson		20 hours
Development of Surveys		10 hours
Development of Web site		40 hours
Testing		10 hours
Maintenance		120 hours
Total		**200 hours**
Total at $20.00/hour		**$4000.00**

Total Cost

Hardware		$1066.00
Software		$1072.00
Time		$4000.00
Sub-Total		**$6167.00**
GST		**$431.69**
Grand Total		**$6598.69**